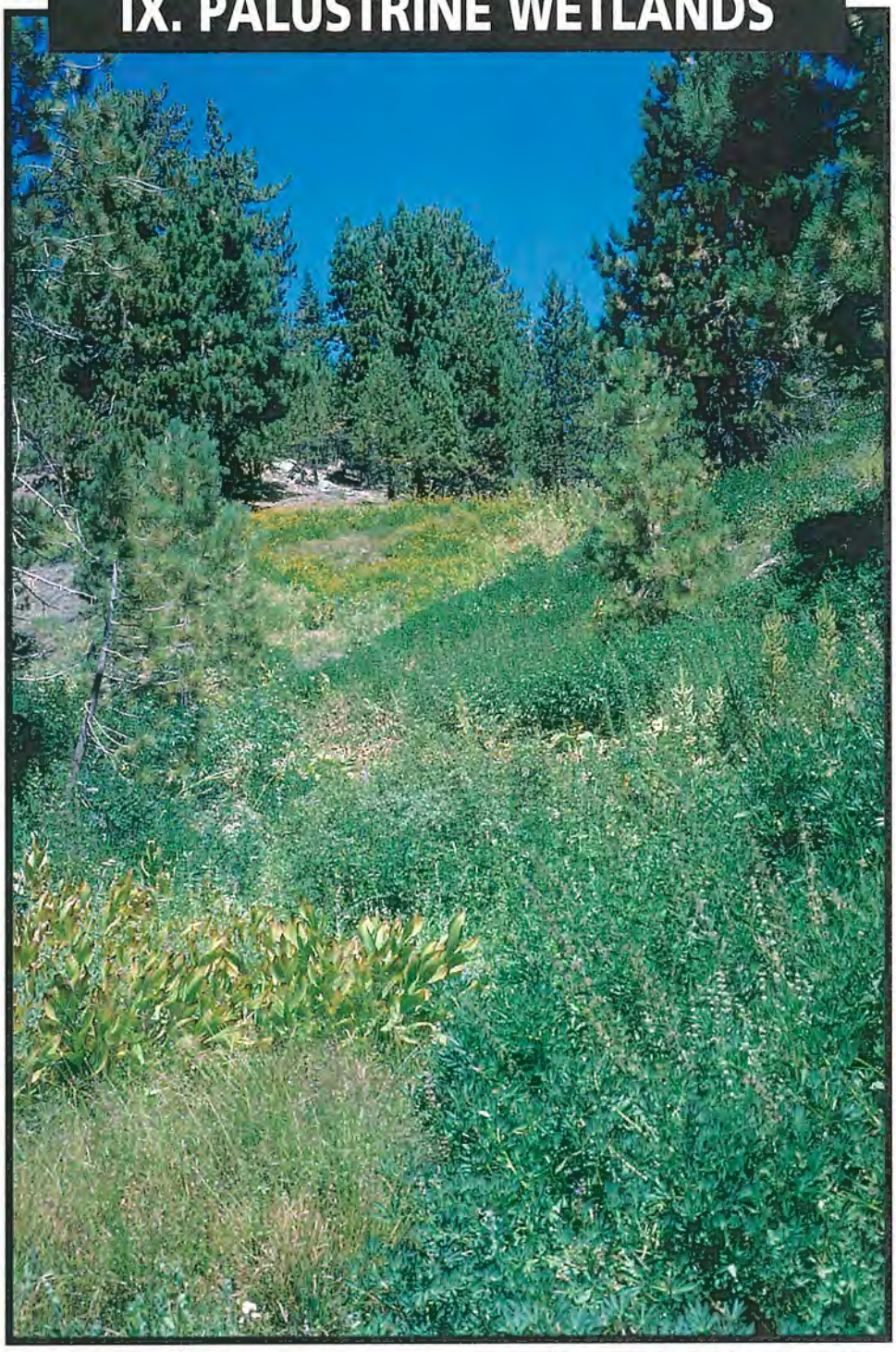
IX. PALUSTRINE WETLANDS



California, Ventura County: Mt. Piños

PALUSTRINE SYSTEM

Wayne R. Ferren Jr.[1], Peggy L. Fiedler[2], Robert A. Leidy[3]

INTRODUCTION

The Palustrine System contains no subsystems as considered by Cowardin et al. (1979) because there is no overwhelming physical features of the environment (e.g., oceanic tides and salinity, shoreline waves, flowing water) that influence the formation of habitats and the structure of biotic communities. All elements of this system are wetlands. Cowardin et al. define the Palustrine System as follows:

> *The Palustrine System...includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt [parts per thousand]. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features locking; (3) water depth in the deepest part of basin less than 2 m at low water; and (4) salinity due to ocean-derived salts less than 0.5 [ppt].*

The study region covers approximately 640 km (400 mi) of coast, all or portions of nine California counties, and extends from approximately sea level to over 3000 m (9000 ft). Many sites supporting palustrine wetlands in each county and from most physiographic areas (see Section II, Environmental Setting) were evaluated during this study, a number of which are included in Figure IX-1. Wetlands of the Palustrine System are bounded by upland or other habitats of the four additional systems of wetlands and deepwater habitats. As illustrate in Figure IX-2 at the Santa Margarita River Estuary in San Diego County, one type of transition between systems is where seeps and springs occur on the margins of estuaries. At the Santa Margarita site, the Palustrine

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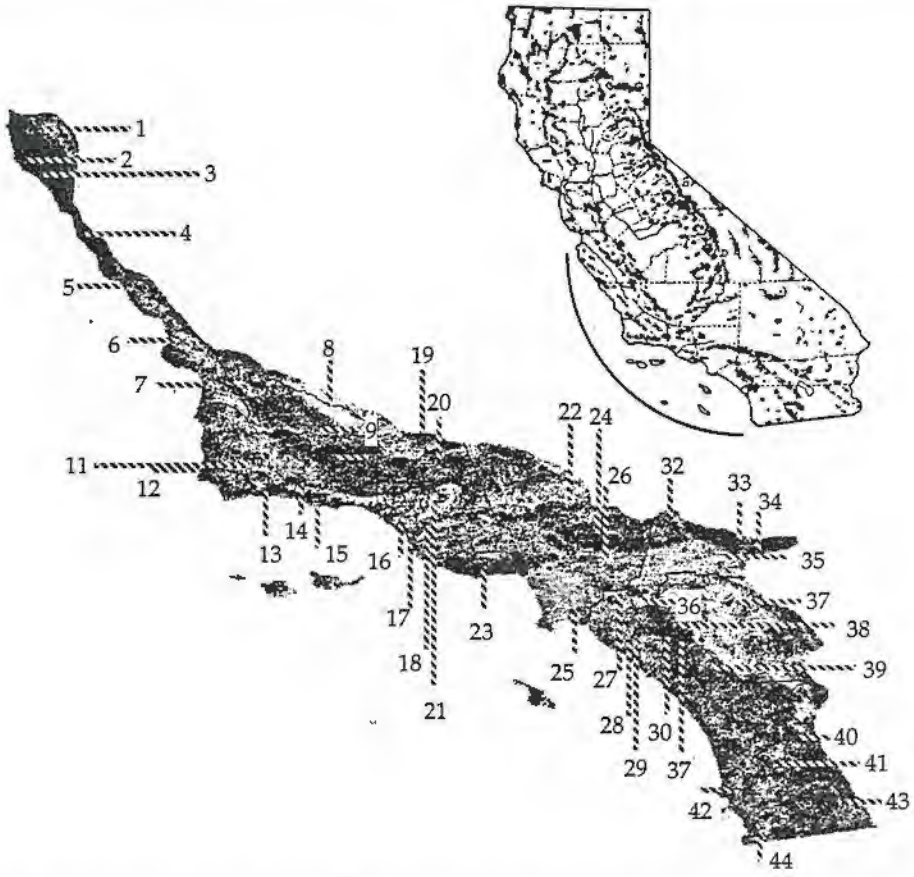

Monterey Co. 1. Carmel River Valley, 2. Andrew Molera State Park, 3. Pfeiffer Big Sur State Park, 4. Santa Lucia Mountains and Los Padres National Forest.
San Luis Obispo Co. 5. San Simeon State Beach, 6. Sweetwater Springs Reserve, 7. Black Lake Canyon, 8. Cuyama Valley.
Santa Barbara Co. 9. Sierra Madre Mountains, 10. San Rafael Mountains, 11. Santa Ynez Valley, 12. Vandenberg Airforce Base, 13. Gaviota State Park, 14. Santa Ynez, Mountains and Los Padres National Forest, 15. Del Sol Vernal Pool Reserve.
Ventura Co. 16. Ventura River Valley, 17. McGrath Lake / State Beach, 18. Santa Clara River Valley, 19. Mount Pinos, 20. Lockwood Valley, 21. Mirror Lake.
Los Angeles Co. 22. Soledad Canyon, 23. Santa Monica Mountains National Recreation Area, 24. San Gabriel Mountains and Angeles National Forest, 25. Ballona Wetlands, 26. Tujunga Wash.
Orange Co. 27. Santa Ana Mountains, 28. Arroyo Trabuco, 29. Yorba Linda Regional Park, 30. San Juaquin Marsh Reserve, 31. Wood Canyon Regional Park, 32. Upper Laguna Lake
Riverside Co., 33. Predo Basin, 34. Temescal Wash, 35. San Jacinto Valley, 36. Santa Rosa Plateau
San Bernardino Co., 37. San Andreas Rift Zone, 38. San Bernardino Mountains and National Forest, 39. San Gorgonio Wilderness Area, 40. Santa Ana River Wash
San Diego Co., 41. Cleveland National Forest, 42. Cuyamaca Mountains and Cuyamaca Rancho State Park, 43. Laguna Mountains, 44. Kearny Mesa, 45. Otay Mesa

FIGURE IX-1. **EXAMPLE WETLAND SITES IN THE PALUSTRINE SYSTEM IN THE CENTRAL AND SOUTHERN CALIFORNIA COAST AND COASTAL WATERSHEDS.** The palustrine study region extends from the Carmel River watershed south to the Tijuana River watershed as bounded by the United States-Mexican border.

System is represented by seasonally-saturated Scrub-Shrub Wetland, and permanently-saturated Emergent Wetland dominated by *Typha domingensis* (Broadleaved Cattail) and *Anemopsis californica* (Yerba Mansa); and Forested Wetland dominated by *Salix lasiolepis* (Arroyo Willow). The Estuarine System is represented by irregularly-flooded Emergent Wetland (salt marsh) dominated by *Arthrocnemum subterminale* (Parish's Glasswort), *Frankenia salina* (Alkali Heath), and *Salicornia virginica* (Pickleweed); and transitional vegetation that receives irregular-flooding from the estuary and permanent saturation from the seep. As illustrated, this brackish marsh vegetation is dominated by *Scirpus robustus* (Salt Marsh Bulrush).

In central and southern California, palustrine wetlands include habitats and/or biotic communities that have been called, for example, ponds (Fig. IX-3), vernal pools and lakes (Fig. IX-5), freshwater marshes or palustrine emergent wetlands (Fig. IX-6), alkali flats, seeps and springs, dune swales, and riparian scrub, woodlands, and forests (Fig. IX-4, IX-6, IX-7). The palustrine system includes the most diverse major group of wetlands; in the Pacific coast region, most of the wetlands can be classified as palustrine, and they might also dominate in terms of total area (Collins 1990). Because of the Mediterranean and arid climates of the region, many of these wetlands are characterized by temporary or seasonal flooding, or by seasonally or permanently high water tables with little or no surface flooding. Because of the many impacts that have resulted from the urbanization of the coastal region, many of the wetlands can be described as artificially impounded, diked, restored, created (Fig. IX-3, IX-9, IX-10), farmed, or disked (see Section I, Fig. I-7). Various palustrine wetlands also have been formed by the conversion from one system to another. A common coastal example in the vicinity of estuaries is Palustrine Emergent Wetland that historically was Estuarine Emergent Wetland, but is now diked and no longer flooded by oceanic tides.

PALUSTRINE WETLANDS

To have a greater appreciation for: (1) the richness of palustrine wetland types; (2) their numerous ecosystem functions and socio-economic values; (3) the extent of impacts to and losses of palustrine wetlands; and (4) the efforts to restore or create them, we believe it is necessary to review the classification of palustrine environments. The many combinations of palustrine wetland classes, subclasses, water regimes, water chemistry, and various hydrogeomorphic categories, series, and units in a Mediterranean climate offer what may seem a limitless richness of wetland types. Although often small in size and isolated in upland surroundings, these wetlands contribute to the great biological diversity of the central and southern California coast and coastal watersheds.

FIG. IX-2. **SAN DIEGO CO., CAMP PENDLETON, SANTA MARGARITA RIVER ESTUARY**. View northward from margin of estuary channel, toward freshwater seep adjacent to the estuary. Such sites generally include hydrogeomorphic units that support wetlands transitional between estuarine emergent wetland (foreground), dominated by *Salicornia virginica* (Pickleweed), and palustrine wetland, as shown here a type of palustrine forested wetland (background) dominated by *Salix lasiolepis* (Arroyo Willow). *Scirpus robustus* (Salt Marsh Bulrush) occurs in the seep-fed brackish transition (center), which herein is classified as a type of estuarine emergent wetland.

Palustrine Wetland Classes and Snbclasses

The Palustrine System includes the following nine classes: 50.110 Rock Bottom Wetland, 50.120 Unconsolidated Bottom Wetland, 50.150 Unconsolidated Shore Wetland, 50.210 Aquatic Bed Wetland, 50.230 Moss-Lichen Wetland, 50.240 Emergent Wetland, 50.250 Scrub-Shrub Wetland, and 50.260 Forested Wetland. Each of these classes occurs in the region covered by this volume, and a key to the system and classes has been provided in Section IV of this volume. A "Key to the Palustrine Classes" also occurs at the end of this discussion on palustrine wetlands and before the "Catalogue of the Palustrine Wetlands".

50.110 Class Rock Bottom Wetland. Although not well-represented in the Palustrine System in the study region, examples of Class Rock-Bottom include Subclass Bedrock (e.g., montane seeps not dominated by Class Moss-Lichen nor Aquatic-Bed, Subclass Algal) and Subclass Rubble-Boulder (e.g., the bottom of some montane palustrine lakes and ponds such as in the San Bernardino Mountains).

50.120 Class Unconsolidated-Bottom Wetland. Palustrine Class Unconsolidated-Bottom includes Subclasses Cobble-Gravel, Sand, Mud, Organic, and Vegetated. Each of these has been documented in the study region (e.g., Ferren and Fiedler 1993; McClelland Engineers, Inc. 1988). Class Unconsolidated-Bottom occurs in various water regimes from permanently-flooded to intermittently-flooded. We added Subclass Vegetated to the Cowardin et al. classification because there are semipermanently-flooded, intermittently-exposed, and seasonally-flooded hydrogeomorphic units such as some ponds (Fig. IX-3) that are colonized by pioneering, nonpersistent annual plants only when the substrate is exposed long enough to facilitate germination, establishment, growth, and reproduction of more than 30% cover of the characteristic species. Typical pioneering species include *Artemisia biennis* (Biennial Sagebrush), *Chenopodium rubrum*, *Cotula coronopifolia* (Brass Buttons), *Juncus bufonius* (Toad Rush), *Lythrum hyssopifolia*, *Rumex maritima* (Golden Dock), and *Xanthium strumarium* (Cocklebur). This wetland type also could be classified as Palustrine Emergent-Nonpersistent Wetland, but we generally reserve that designation for some types of vernal pools, flats, and plains.

50.150 Class Unconsolidated Shore Wetland. This class of palustrine wetland occurs on pond and palustrine lake margins and can include Cobble-Gravel, Sand, Mud, Organic, and Vegetated subclasses. Cowardin et al. included Subclass Vegetated for the Estuarine System, but we believe there is equal validity for including it here. Many of the same pioneering species that colonize exposed unconsolidated-bottom habitats may occur here, although the class is usually richer

FIG. IX-3. **SAN DIEGO CO., CAMP PENDLETON, O'NEIL LAKE**. View northeastward across a portion of this artificial palustrine pond during low-water conditions. The semi-permanently-flooded, unconsolidated-bottom is characterized by nonpersistent vegetation, here dominated by *Chenopodium rubrum* and the emergent wetland is dominated by *Scirpus californicus* (California Bulrush).

FIG. IX-4. **SANTA BARBARA CO., GAVIOTA AREA**. View northward across a field of *Brassica nigra* (Black Mustard) toward an intermittent stream and a palustrine woodland wetland (center) dominated by *Platanus racemosa* (Western Sycamore) and the Santa Ynez Mountains (background). This wetland type is characterized by a temporarily-flooded to phreatophytic, foothill-stream-bank hydrogeomorphology.

in species and may include many nonpersistent types that are more typically upland weedy species rather than hydrophytes.

50.210 Class Aquatic Bed Wetland. In the Palustrine System, this class can include Attached Algal, Floating Algal, Rooted Vascular, and Floating Vascular subclasses. Cowardin et al. did not divide the algal subclass as we have throughout this treatment, giving the classes parity with the vascular group. Also unlike Cowardin et al., we exclude various rooted vascular species that tend to emerge from water or in some cases have leaves that float on water (see Section III, Table III-8, Substrate/Dominant/Characteristic Types: Riverine, Lacustrine, and Palustrine Systems). In general, aquatic-bed species herein include genera with largely submerged species (e.g., *Ruppia*) or submerged and floating-leaved species (e.g., *Potamogeton*), but not genera that are largely emergent (e.g., *Polygonum*) with some floating-leaved species, infraspecific taxa, ecotypes, or environmentally-induced phenotypic plasticity.

50.230 Class Moss-Lichen Wetland. In the study region, Class Moss-Lichen occurs at: (1) waterfalls, springs, and seeps in a mosaic that can include various green algae and vascular plants (see Fig. VII-16); and, (2) in perennial streams and rivers, particularly those in montane settings such as the in the Santa Lucia Mountains in Monterey County.

50.240 Class Emergent Wetland. We follow Cowardin et al. in recognizing Subclasses Persistent and Nonpersistent Emergent Wetland. The great richness of wetland types in the study region is derived in part from the many forms of both that have developed in a rich landscape with many hydrogeomorphic types. Emergent-Persistent Wetlands include the many freshwater and alkali marsh types dominated by genera such as *Carex* spp. (sedges), *Eleocharis* spp. (spike-rushes), *Juncus* spp. (rushes), *Scirpus* spp. (bulrushes), *Sparganium eurycarpum* (Bur-reed), *Typha* spp. (cattails), and many others (see Figs. IX-3, IX-6, IX-9). They also include alkali, salt, sulfur, and petroleum-affected types. Hydrogeomorphic units that support them include, for example, channels, seeps and springs, floodplains, margins of lakes and rivers, and various basins such as pools and ponds, palustrine lakes, montane meadows, and dune swales.

Emergent-Nonpersistent Wetlands are dominated by annual plants or perennials whose above-ground biomass does not survive the beginning of the subsequent growing season. Various examples characterize hydrogeomorphic units that are saturated or flood only seasonally or intermittently. Some vernal pools in San Diego County (P. Zedler 1987), alkali vernal plains (Ferren and Fiedler 1993) and tenajas in Riverside County, and montane vernal plains in Ventura and Riverside counties support Emergent-Nonpersistent Wetlands (e.g., see Figs. IX-33 to IX-39).

Dominant genera include, for example, *Dowingia, Lasthenia, Orcuttia, Pogogyne,* and *Psilocarphus*.

50.250 Class Scrub-Shrub Wetland. We have expanded the treatment by Cowardin et al. to include eight subclasses rather than five, as in Cowardin et al.: (1) Broadleaved-Deciduous (e.g., *Cornus* spp., *Rosa* spp. and *Salix* spp.; Figs. IX-40, 42); (2) Needleleaved-Deciduous; (3) Broadleaved-Evergreen (e.g., *Baccharis* spp. and *Pluchea* sp.; Figs. IX-43 to IX-48); (4) Needleleaved-Evergreen; (5) Mixed Deciduous; (6) Mixed Evergreen; (7) Mixed Deciduous and Evergreen; and (8) Dead (e.g., dead stands of *Baccharis salicifolia* on flooded lake margins). Some of these examples such as Subclass Needleleaved Evergreen have not been reported from the study region. We concur with Cowardin et al. (1979:22) that this class is: "...dominated by woody vegetation ...[including] true shrubs, young trees, and trees or shrubs that are stunted because of environmental conditions." However, we disagree that the stature of the vegetation is less than 20 ft (6 m) tall. Many natural stands of tree species in the study region, especially *Salix lasiolepis* (Arroyo Willow) do not exceed 20 ft but maintain the ecosystem functions of forests of the same species with greater stature. We consider Class Scrub-Shrub to include stands of tree species only when they do not exceed 15 ft in height. Exceptions include: (1) saplings that have regenerated after a catastrophic flood event and do not form stands with broader mature trunks that may be decumbent and that are subjectively determined to be larger contiguous forest types; and, (2) smaller grove-types at seeps and scattered along intermittent streams or pond and lake margins that are better classified as scrub.

Dominant or characteristic shrub genera are many and include, for example: *Baccharis, Clematis, Cornus, Forestiera, Lepidospartum, Lonicera, Myrica, Pluchea, Ribes, Rosa, Rubus, Salix, Sambucus*, and *Toxicodendron*; whereas examples of the many associated shrub species include: *Artemisia, Arctostaphylos, Brickellia, Ceanothus, Ericameria, Eriodictyon, Lotus, Malosma, Opuntia, Quercus, Rhus, Salvia, Venegesia,* and *Yucca*. Class Scrub-Shrub Wetland can occur in many hydrogeomorphic settings, such as: (1) in stream and river beds (Figs. IX-43, 44); (2) on stream and river banks, floodplains, and terraces (Fig. IX-48); (3) on step-like alluvial terraces and out-wash fans along the west side of the San Gabriel Mountains (Hanes et al. 1988); (4) at alkali seeps (Figs. IX-45, IX-46); (5) on lake and reservoir margins; and, (6) in dune swales (e.g. San Antonio Terrace Dunes at VAFB in Santa Barbara County).

50.260 Class Woodland and Forested Wetland. As with Class Scrub-Shrub, we changed Cowardin et al. from five to eight subclasses, including: (1) Broadleaved-Deciduous (e.g., *Alnus* sp., *Platanus* sp., *Populus* spp., *Salix* spp; IX-19, IX-55, 56); (2) Needleleaved Deciduous; (3) Broadleaved Evergreen (e.g., *Lithocarpus densiflora*, Fig.IX-57; *Myrica californica*, Fig. IX-58, *Quercus agrifolia*, and *Umbellularia californica*); (4) Needleleaved Evergreen (e.g., *Sequoia*

FIG. IX-5. **SAN DIEGO CO., KEARNY MESA, MIRAMAR MOUNDS NATIONAL NATURAL MONUMENT.** View northeastward along long-axis of a vernal pool in an *Adenostoma*-dominated chaparral context (background). Although dominance types change as desiccation occurs, as shown here samples include *Callitriche marginata*, *Eryngium aristulatum*, *Eleocharis macrostachya*, and *Lilaea scilloides*. *Downingia* is a typical annual dominant that matures and flowers as desiccation continues (see Figs. IX-36, IX-37).

sempervirens; Fig. IX-51); (5) Mixed-Deciduous; (6) Mixed Evergreen; (7) Mixed Evergreen and Deciduous; and (8) Dead. We changed the Cowardin et al. class name because many tree-dominated types are not forests but are more accurately considered woodlands or even savannahs. The vegetation is dominated by woody species exceeding 15 ft in height when the vegetation is not composed of saplings that have regenerated after a catastrophic flood event, and form stands that are subjectively determined to be larger contiguous forest types, rather than smaller grove-types at seeps and scattered along intermittent streams or pond and lake margins. Stands dominated by trees can be considered groves, rows, stands, savannahs, woodlands, and forests. Class Forested Wetland can occur in many hydrogeomorphic settings, such as: (1) seeps (Fig. IX-58); (2) riparian corridors along streams and rivers (Fig. IX-51); (3) floodplains (Figs. IX-52, 53); (4) terraces (Figs. IX-54, 55, 56); (5) bottomlands; and, (6) lake and reservoir margins (Fig. IX-50).

Although "riparian" forests were not treated in the *Vegetation of California* (Barbour and Major 1977), extensive studies and many workshops and symposia (e.g., Sands 1980; Warner and Hendrix 1984; U.S. Forest Service 1988; Borchert et al. 1988; Faber et al. 1989; Schoenherr 1989; Minshall et al. 1989) have taken place since then that provide a wealth of material from which to draw upon for identification of types, and for information on ecosystem functions, socio-economic values, losses and impacts, and restoration efforts. It is not our purpose to review this extensive literature; however, much of it is useful in the classification of wetlands and the representation of wetland types dominated or characterized by species of trees.

Palustrine Hydrogeomorphic (HGM) Units

Palustrine hydrogeomorphic (HGM) units are landforms characterized by a specific origin, geomorphic setting, water source, and hydrodynamic (water regime). These features coupled with water chemistry and physiognomy of vegetation provides an opportunity to differentiate palustrine wetlands beyond the class and subclass levels. Although some redundancy of terminology in the Palustrine System occurs between the Cowardin classes and subclasses and our HGM units, the use of HGM units is necessary to distinguish site characteristics from higher orders of classification. This is true throughout our classification and within each system. Refer to the combined riverine, lacustrine, and palustrine hydrogeomorphic classification (Section III, Table III-6) for the hierarchical relationship of the units; to Table IX-1 for the distribution of the units among the various water regimes in the Palustrine System; and, to Section XIII, Glossary, for definitions of the various HGM units.

Water Bodies (HGM Category .100). The richness of palustrine wetland types is derived in part from the fact that there are many ecosystem contexts in which they can occur. Water bodies either can be: (1) the wetlands themselves (supporting biotic dominance types or not), or (2) sites for the development of wetlands in various HGM categories, series, and units from the riverine, lacustrine, and palustrine environments. Palustrine wetlands occur in each of the eight series within the water body category: **(.110) Pools**, such as vernal pools at Ellwood and Del Sol Reserve in Santa Barbara County (Figs. IX-10, IX-29) and Miramar Mounds National Natural Monument in San Diego County (IX-5), and tenajas at Santa Rosa Plateau in Riverside County; **(.130) Springs**, including cold and hot water springs such as Gaviota Hot Springs in Santa Barbara County; **(.140) Palustrine Ponds, Lakes and Reservoirs**, including dune ponds such as McGrath Lake in Ventura County, fault sag ponds such as Lost Lake in San Bernardino County (Fig. IX-5), glacial ponds such as Dollar Lake in San Bernardino County (Figs. IX-11, IX-12), and palustrine vernal lakes such as Mirror Lake in Ventura County Figs. X-11a&b) and Santa Rosa Plateau in Riverside County (Figs. IX-24, IX-25); **(.150) Lacustrine Lakes and Reservoirs** including montane alkali lakes such as Baldwin Lake in San Bernardino County (Figs. VIII-3) and canyon reservoirs such as Lake Casitas in Ventura County; **(.160) Streams** including canyon streams such as Matilija Creek in Ventura County; **(.170) Rivers** such as the Big Sur River in Monterey County (Fig. IX-51) and the Santa Margarita River in San Diego County; and **(.180) Drainages** including coastal canyon drainages such as Black Lake Canyon (Fig. IX-49) in San Luis Obispo County. These hydrogeomorphic units of water bodies can be used to classify the ecosystem context, whereas the remaining palustrine HGM categories and their corresponding series and units can be used to classify the various wetlands associated with them. Other wetland HGM units occur in the palustrine system that are not associated immediately with bodies of surface water, such as seep wetlands, terrace wetlands, plain wetlands, and some swale, marsh, and meadow wetlands.

Channels, Drainages, Inverts, Falls (HGM Category .200). We include eight HGM series in the channels and related HGM category most of which support palustrine wetlands: **(.210) Stream Channels** including montane, foothill, valley, and coastal plain types that support, for example, scrub-shrub wetland dominated by *Baccharis salicifolia* (Mule Fat, Fig. IX-43); **(.220) River Channels** including montane, foothill, valley, distributary, and canyon HGM units that support, for example, extensive stands of *Scirpus californicus* (California Bulrush) such as the Santa Ynez River in Santa Barbara County; **(.230) Backbar Channels** that contain sluggish or ponded water and that support various classes of palustrine wetland; **(.240) Drainage Channels** including vernal drainage channels that can be dominated by sedges, rushes, grasses, and cattails on the coastal plain of the study region (e.g., San Luis and Santa Barbara counties); **(.250) Inverts** such as montane drainage inverts that are phreatophytic or intermittently-flooded and support

FIG. IX-6. **RIVERSIDE CO., SANTA ANA RIVER WATERSHED, TEMESCAL WASH**. View westward across Temescal Wash toward the Santa Ana Mountains. Palustrine emergent wetland (lower center) is dominated by *Typha domingensis* (Narrowleaved Cattail), and the palustrine forested wetland (upper center) is dominated by *Salix laevigata* (Red Willow) and *Salix lasiolepis* (Arroyo Willow). These wetland types are characterized by a semipermanently- to seasonally-flooded fault-sag-pond and canyon-stream hydrogeomorpology.

narrow stands of forested wetland, such as within the upper Mill Creek Watershed in the Santa Lucia Mountains in Monterey County; **(.260) Falls** including montane and foothill stream and river falls, such as Nojoqui Falls in the Santa Ynez Mountains in Santa Barbara County (Fig. VII-16) that supports various palustrine wetlands adjacent to riverine types; and **(.280) Artificial Ditches**, in particular agricultural ditches such as those on the Oxnard Plain in Ventura County and the Santa Ynez and Santa Maria valleys in Santa Barbara County that are generally clogged with bulrushes and cattails.

Shores, Beaches, Banks, Margins (HGM Category .300). Hydrogeomorphic series and units in this category generally occur on the periphery of water bodies and can represent transition areas between classes within systems or between systems. Seasonally-flooded **(.310-50) Shores** of ponds are often characterized by Unconsolidated Shore (Vegetated) or Emergent-Nonpersistent Wetland (e.g. MOD III Pond at Vandenberg Air Force Base in Santa Barbara County), whereas **(.370-380) Banks** of rivers often support Palustrine Forested Wetland (e.g., banks of the Big Sur River in Monterey County, Fig. IX-51). **(.390) Margins** can occur on the outer edge of swales, marshes, and floodplains that often support a different class of vegetation than the main basin or plain.

Beds, Bottoms, Bars (HGM Category .400). These nine HGM series and their associated units include **(.410-50) Beds** and **Bottoms** (here used synonymously) and **(.470-80) Bars** of channels (such as stream and river channels) and ponds, lakes, and other basins that are shallow and flooded permanently or are flooded semipermanently, seasonally, or intermittently. Unconsolidated-Bottom, Emergent-Persistent and Nonpersistent subclasses occur in association with these HGMs in the study region (e.g., VIII-8, 9, 17; IX-3). Bars also occur in channels or along shores, but are separated from shore habitat by backbar channels (see Fig. VII-2). Although many bars in riverine environments support riverine wetland classes, others can support palustrine wetland classes, such as Scrub-Shrub Wetland (Fig. IX-42).

Flats, Plains, Fans, Washes, Bottomlands, Terraces (HGM Category .500). A great number of wetland types occur in association with the six HGM series and their units in this category. For example, **(.510) Flats** are usually underlain by impervious soils, are seasonally saturated or flooded, and lack a clearly defined basin, separating them from vernal pools (e.g., Lake Elsinore area in Riverside County; Fig. I-3); **(.520) Plains** are larger than flats and often occur in alkali valley floors that are also underlain by impervious soils and are saturated or flooded seasonally (e.g., Old Salt Creek area and San Jacinto Valley in Riverside County; Figs. IX-8, IX-39) or in rare montane valley floor HGM units (e.g., Murrietta Creek Watershed in Riverside County,

and Upper Ojai Valley in Ventura County; see Section X, Fig. X-10a,b).

Deltas, washes, floodplains, bottomlands, and terraces are other series in this category that are generally related to active fluvial processes. **(.530) Deltas** often occur when streams and rivers empty their sediment loads into lakes, estuaries, or oceans (e.g. the mouth of the Ventura River) and can support many classes of palustrine wetlands; **(.540) Washes** occur in association with intermittent streams and rivers and often support various forms of Scrub-Shrub Wetland depending on the position in the watershed and aridity of the site (e.g., an *Atriplex canescens* dominated alluvial-wash in Barringer Canyon, San Luis Obispo Co. and a *Lepidospartum squamatum* dominated channel-wash in Soledad Canyon in the Santa Clara River Watershed in Los Angeles Co.); **(.550) Floodplains/Bottomlands** associated with streams and rivers support various forms of emergent, scrub-shrub and forested wetland largely depending on the frequency and duration of flooding and degree of saturation of the habitat (see Figs. IX-49, IX-52, IX-53); and **(.560) Terraces**, which often represent (1) historic floodplains into which stream and river channels have incised, (2) intermittently- or temporarily-flooded high-water plains, or (3) floodplains from which the sites have been separate by artificial structures. These situations leave the sites without significant surface water and thus they typically support phreatophytic scrub-shrub (e.g. dominated by *Pluchea sericea*, Fig. IX-48), woodland (e.g., dominated by *Platanus racemosa*, Western Sycamore, Fig. IX-54), or forested wetlands (e.g., dominated by *Populus balsamifera*, Black Cottomwood, Figs. IX-55, IX-56).

Headlands, Bluffs, Slopes (HGM Category .600). Although headlands and bluffs can be important HGM series in the marine system, **(.630) Slopes** and **(.640) Allnvial Fans** provide sites for palustrine wetlands. Various phreatophytic forest types grow on canyon slopes such as in Mill Creek Watershed in Monterey Co., where some slopes are characterized by groves of *Acer macrophyllum* (Big Leaf Maple), *Umbellularia californica* (California Bay), and *Sequoia sempervirens* (Coast Redwood).

Seeps, Springs (HGM Category .700). Seeps and springs are common in some areas of the study region (e.g. Cuyamaca Mountains in San Diego County) and together form a wide variety of environments depending on origin, water regime, water chemistry, and dominance types. **(.710) Seeps** generally do not have surface flow, are usually seasonally or permanently saturated, may be affected by alkali, sulfur, or petroleum, and occur in the context of drainage heads (Fig. IX-57), bluffs and slopes, canyons, stream or river beds and banks, mountains, foothills, and valleys. **(.720) Springs** occur similarly but are characterized by the emergence of flowing water at least for part of the year. Springs can provide unique and threatened environments, such as Shey Meadows Spring in the Big Bear Basin of the San Bernardino Mountains, which is the only habitat for a native fish,

the Shey Meadows Stickleback (*Gasterosteus* sp.unnamed). **(.730) Hot Springs** are often affected by sulfur (e.g., Gaviota Hot Springs in Santa Barbara County) and also can provide unique wetland environments.

Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales (HGM Category .800). Perhaps the greatest richness of HGM units occurs within the palustrine basin hydrogeomorphic category. **(.810) Vernal Pools**, include at least six major unit types: **Coastal-Terrace Vernal Pools** in San Luis Obispo County (e.g., San Simeon State Beach), Santa Barbara County (e.g., Ellwood Shores Figs. IX-29, IX-30; Del Sol Reserve in Isla Vista), and San Diego County (e.g., Camp Pendleton); **Mesa Vernal Pools** in Santa Barbara County (Burton Mesa at Vandenberg Air Force Base) and San Diego County (e.g., Kearny, Del Mar, San Diego, and Otay mesas; Figs IX-34 to 37); **River-Terrace Vernal Pools** in Santa Barbara County (Ballard in the Santa Ynez Valley); **Coastal Valley and Plain Vernal Pools** in Santa Barbara County (e.g., Orcutt and Santa Maria in the Santa Maria Valley); **Foothill-Valley Vernal Pools** in Santa Barbara County (e.g. Sedgwick Ranch at Figueroa Mountain; also see "Vernal Ponds"), and Montane-Plateau Vernal Pools in Riverside County (e.g., Santa Rosa Plateau). Other examples could be mentioned here but have been grouped within **Alkali-Vernal-Plaius**, **Vernal Ponds**, or **Vernal Lakes**.

(.820) Palustrine Ponds and Lakes include a large group of natural and artificial basins that are deeper and flood longer than vernal pools and thus can support a biota either similar to or greatly different from vernal pools. Vernal lakes are separated from vernal ponds in being larger and often supporting a flora that can include species similar to those characteristic of lacustrine lake shores and freshwater marshes. Examples of ponds include: permanently-flooded **Coastal Dune Ponds** and "Lakes" in San Luis Obispo County (e.g., the Dune Lakes and Oso Flaco Lake; Fig. IX-13) and Ventura County (McGrath Lake, the only remaining dune lake in southern California; Ferren and Fiedler 1993); **Coastal Canyon Ponds** in San Luis Obispo County (e.g., at Pico Creek); and **Fault Sag Ponds** including seasonally-flooded types in Santa Barbara County (e.g., Rancho Las Flores near Los Alamos), Ventura County (at Sulfur Mountain and Mirror Lake in Ojai Valley, Figs IX-11a,b); and permanently-flooded types in San Bernardino County (Lost Lake in the San Andreas Rift, Fig. I-5).

Also included are **Glacial Ponds** and "Lakes" in San Bernardino County (e.g., Dollar Lake in the San Gorgonio Wilderness Area; Figs. IX-11, 12); **Valley Ponds** in Santa Barbara County (e.g., in foothill valley at Sedgwick Ranch Reserve; Figs. IX-15, 16); and **Palnstrine Vernal Lakes** in Santa Barbara County (e.g., heavily impacted Laguna Blanca at Hope Ranch; historic

"Lagunitas" at Carpinteria, apparently also related to fault structure), in Ventura County (remnants of Mirror Lake, also a fault sag pond, in the Ojai Valley), and in Riverside County (Santa Rosa Plateau; Figs. IX-24, IX-25). Numerous artificial or altered natural **Agricultural and Recreational Ponds** occur throughout the study region (e.g., MOD III Pond, Vandenberg Air Force Base; Fig. IX-14).

(.830) Meadows include seasonally-flooded and/or seasonally-saturated **Montane Vernal Meadows** in San Bernardino County (e.g., Champion Lodgepole-Pine Meadow in San Bernardino National Forest) and in San Diego County (e.g., Laguna Mountains, Fig. IX-26); and seasonally-flooded and/or permanently-saturated **Montane Perennial Meadows** in San Bernardino County (e.g., South Fork, Santa Ana River in the San Gorgonio Wilderness Area). Wetland meadows are characterized by a mosaic of herbaceous dicots and monocots that provide a "wildflower garden effect" rather than mostly sedges, spike-rushes, bulrushes, rushes, cattails, and grasses of many vernal and perennial marshes.

(.840) Marshes are widespread throughout the study region, but usually are small and isolated in basins and drainages or in dike or impounded areas. They can be circumneutral freshwater types or affected by alkali, halite, or sulfur, or other types of water chemistry. Examples include: **Vernal Freshwater Marshes**, which occur in a wide range of ecosystem contexts and dominance types in all counties of the study area (e.g., San Joaquin Marsh Reserve in Orange County; Santa Rosa Plateau, Kopecko and Lathrop 1975; and O'Neil Lake in San Diego County, Fig. IX-3), and also can be classified within swale and other HGM categories when the features are appropriate (e.g., drainage swales in the Laguna and Santa Ana Mountains; Fig. IX-27, 28); **Perennial Freshwater Marshes**, which occur in structural basins, on margins of reservoirs and channels, and other sites where water occurs permanently or semipermanently (e.g., Temescal Wash, Riverside County; Fig. IX-6); **Saline Marshes** including a range of interior alkali and other mixosaline types not dominated by sodium chloride (e.g., marshes at San Jacinto National Wildlife Refuge in Riverside County); and **Haline Marshes** such as those on deltas adjacent to estuarine wetlands or in diked estuaries dominated by *Salicornia virginica* (Pickleweed) (e.g., Ballona Wetlands in Los Angeles County; Fig. I-7).

Other **Marsh** HGM units include **Stream-Channel Marshes** in Santa Barbara County (San Antonio Creek at Vandenberg Air Force Base; Fig. IX-18), which also can be classified Emergent-Persistent Stream-Channel Wetland; **River-Channel Marshes** including examples on the Santa Maria, Santa Ynez, Ventura, Santa Clara, Santa Ana, Santa Margarita, and San Luis Rey rivers; **Lake Shore Marshes** such as the Emergent-Persistent Wetlands on the margins of

reservoirs including Lake Cachuma, Lake Casitas, and Lake Morena dominated by *Scirpus californicus* (California Bulrush); and **Diked Estuarine Marshes** such as the freshwater and brackish marshes in diked basins and impounded channels at Goleta Slough in Santa Barbara County dominated by *Scirpus califarnicus, Sparganium eurycarpum* (Bur-Reed), and *Typha domingensis* (Narrowleaf Cattail).

(.850) Swales can support wetlands from all classes of the palustrine system. **Montane Drainage Swales** are frequently dominated by rushes (e.g., *Juncus mexicanus* in the Laguna Mountains in San Diego County, Fig. IX-27; and *Juncus rugulosus* in the Santa Ana Mountains in Riverside County, Fig. IX-28). **Coastal Drainage Swales** also frequently support stands of rushes such as *Juncus phaeocephalus* at Piedras Blanca in San Luis Obispo County. **Dune and Beach Swales** are common among the extensive dunes in central California (e.g., San Antonio Terrace Dunes at Vandenberg Air Force Base in northern Santa Barbara County; Fig. I-4), but are a declining resource in southern California were there are few occurrences remaining in Ventura County (e.g., *Juncus textilis* dominated swale at Emma Wood State Beach, Ferren et al. 1990; and at McGrath State Beach) and in San Diego County (e.g., *Juncus mexicanus* and *Juncus acutus* dominated swale at South Carlsbad State Beach).

Artificial Structures (HGM Category .900). In the Palustrine System of our study region, Artificial Structures do not form the important habitats that they do in the Marine, Estuarine, Riverine, and Lacustrine systems. Although many structures such as dams, drains, berms, diversions, etc. cause significant impacts to palustrine wetlands, and even create palustrine wetlands, they do not themselves generally form substrate on which palustrine wetlands develop. One notable exception, however, is the growth of Palustrine Moss-Lichen Wetland on these structures.

Ecosystem Functions and Socio-Economic Values

Ecosystem Functions. Ecosystem functions are processes that are necessary for the self-maintenance of an ecosystem such as primary production, nutrient-cycling, decomposition, etc. (L. C. Lee & Associates, Inc. 1993). We also include maintenance of habitat for particular ecosystem-dependent organisms and for the preservation of the richness of habitats and landforms. In the Palustrine System, many of the functions are associated in the context of the functions of other wetland systems to which they are adjacent or within which they occur. We have arranged a brief discussion of palustrine ecosystem functions as proposed by Sather and Smith (1984). Because of

the great number of wetland types in the Palustrine System, and their associated functions, it is not our intent to provide an exhaustive review of the topic here. Ecosystem functions are vital, however, in attempting to differentiate among the various wetlands for classification and conservation purposes.

Food Chain Support and Nutrient Cycling. "The food chain support function of wetlands is the direct or indirect use of nutrient sources derived from wetlands by heterotrophic organisms [i.e., those that do not produce their own food]" (Sather and Smith 1984:21). Alternatively, Zedler et al. (1990:3) proposed the definition, "...the production of organic matter and its direct or indirect use, in any form, by organisms inhabiting, or associated with, wetland ecosystems." Sather and Smith list and discuss 68 wetland characteristics that are important to food chains; a sampling of these that can affect palustrine wetlands are contiguity, shape of basin, exposure, gradient, land cover of watershed, vegetation form, substrate, salinity, pH, flooding extent and duration, flow velocity and scouring, water depth, wetland-water edge, plant form richness, plant productivity, alkalinity, and eutrophic condition.

Differences in the complexity of foodchain support and in the types of consumers (e.g., migratory waterfowl, resident wetland-dependent birds, amphibians, reptiles, etc.) also can contribute to the differentiation between types of wetlands that might otherwise have similar hydrogeomorphic units and vegetation physiognomy. These food chain differences also become important when natural wetland types are identified for use as reference sites for comparison against restored or created types to assess the issue of ecosystem success at the artificial sites. Our classification expands the system, class, and subclass hierarchy to include: (1) water regime and chemistry types; (2) categories, series, and units of hydrogeomorphic types (i.e, "habitats"); and, (3) substrate, dominance, or characteristic types to help distinguish wetland types and address the subtle physical and biological differences that might reflect differences in food chain support and other ecosystem functions. Regarding "riparian" ecosystems, Onuf and Quammen (1990:127) concluded, "Food chain support is not a general consequence of high productivity and high export. Rather, it is a special relationship involving a limited array of species in special circumstances, where changes resulting in increased primary productivity, in fact, can eliminate the food chain support function altogether in the sense of support for desirable species." Thus quantity of support is not necessarily a measure of importance." In California's often small and isolated wetlands, it is the special conditions of food chain support that may make this ecosystem function vital to consumers dependent on a particular wetland type. Identification of wetland types is important to the identification of specialized food chains.

Habitat. Palustrine wetlands provide habitat function for many groups of organisms or communities of organisms that have been documented or summarized by many researchers, for example: (1) native plant communities (e.g., Barbour and Major 1977; Warner and Hendrix 1984; Zedler 1987; Faber et al. 1989); (2) invertebrate communities (e.g., vernal pools in Zedler 1987, Balko and Ebert 1981, Dehoney and LaVigne 1981; Sather and Smith 1984); (3) migratory waterfowl (e.g., coastal wetlands in Onus and Quammen 1985); (4) nesting birds (e.g., riparian systems in Gaines 1980; Gray and Greaves 1984; Olson and Gray 1988; Zembal 1990); (5) reptiles and amphibians (e.g., riparian systems; Brode and Bury [1984] estimated that riparian systems in the state provide habitat for 83% of the amphibian and 40% of the reptile species; Kaplan 1981); (6) native fish (e.g., riparian systems in Faber et al. 1989); (7) mammals (e.g., riparian systems in Faber et al. 1989; vernal pools in Winfield et al. 1981); and (8) plant and animal species of special concern (see Appendix XV-1 and many of the above references).

Regarding "riparian systems", Onuf and Quammen (1990:127) have concluded, "The paramount values of these systems are values of rarity, not of abundance as may be true in other regions...Coastal wetlands and riparian ecosystems provide critical needs for rare and endangered species and are essential wintering, breeding, and migrating sites." In a summary of Pacific wetland "regionality", (Zedler 1990:14) observed, "The remaining wetland areas have great importance within the region as botanical and wildlife habitats. With highly variable climates, many mobile species may utilize wetlands as refugia during drought periods, and some non-mobile species may persist only in wetlands." Identification and classification, in a hierarchical system, of the many palustrine wetland types in the study region provides a framework within which the various habitat functions can be differentiated by context at the level of ecosystem, wetland type, or hydrogeomorphic unit.

Hydrology and Water Quality. The functions of hydrology and water quality range from montane meadows as snow-melt water-storage features (Collins and Dunne 1990) and stabilization of channel banks and shorelines by riparian forests (e.g., Kondolf and Curry 1984) to uptake of nutrient pollutants by freshwater marsh vegetation (e.g., Sather and Smith 1984). As with food chain support and habitat functions, differentiation of palustrine wetlands for hydrology and water quality functions is an important step on the conservation of different types of wetlands because of different but vitally important attributes.

Socio-economic Values. Socio-economic values of wetlands belonging to the Palustrine System are society's perceptions of the worth of a palustrine ecosystem, typically stemming from whether the system provides a form of benefit or pleasure (adapted from L. C. Lee & Associates,

Inc. 1993). Most of the values are derived from the various ecosystem functions that characterize a particular palustrine wetland ecosystem. We recognized four categories of socio-economic value: (1) Consumptive Values, e.g., logging of *Sequoia sempervirens* (Coast Redwoods) from riparian corridors; (2) Nonconsumptive Values, e.g., sport fishing, boating, swimming, bird watching, botanizing, teaching, and research; (3) Cultural Values, e.g., Native American use of plants from dune swales at San Antonio Terrace Dunes; and (4) Aesthetic and Natural Heritage Values, e.g., use of palustrine wetlands at golf courses such as Mirror Lake at Hope Ranch in Santa Barbara County, regional parks, and residential developments. Identification and preservation of the region's wetland heritage contributes to the socio-economic value and quality of life enjoyed by residents of the region.

The majority of the types of wetlands in the study region and in California as a whole belong to the palustrine system. This wealth of natural heritage and resources can be understood only in the context of identification in a hierarchical system of classification that is detailed enough to attempt to fully capture this heritage. Although estimates by many suggest that most of the palustrine wetlands in California have been destroyed, the rich and important examples documented herein are worthy of appreciation and conservation.

Palustrine Wetland Losses and Impacts

Losses. At the state-wide level, the California Department of Parks and Recreation (CDPR 1988) reports that California has lost approximately 95% of the riparian wetlands, 90% of freshwater marshes, and 90% of the vernal pools. Along the southern coast of the state they estimate there has been a 75% reduction in wetlands. Examples of palustrine wetlands that have been lost in southern California include 90-95% of the "riparian community" (Faber et al. 1989; CDPR 1988) including a loss of 40% of the riparian wetlands in San Diego County during the last decade alone; and (2) 90% of the vernal pools (P. Zedler 1987).

Impacts. Changes in palustrine wetlands as a result of various impacts to the resources can affect the classification of these wetlands. Wetlands can be converted from one type to another or from one system to another (e.g., deforestation, impoundment of streams and rivers, draining, and excavation of basins). Deforestation such as at Arroyo De La Cruz, San Luis Obispo Co. (Fig. IX-7) has been the principal method of converting forested wetland to range or crop land. Draining has been one technique applied to vernal plains for conversion to agricultural land or urban development, such as at Hemet in San Jacinto Valley, Riverside Co. (Fig. IX-8). Impacts to palustrine wetlands can come from natural sources such as catastrophic floods and mud or debris flows, particularly after fires, and tidal intrusion into freshwater marshes during large storms.

Additional sources of impacts related to human activity are numerous and can be grouped, for example, into: (1) **agricultural development** (e.g., deforestation, draining, increased sedimentation in basins, fragmentation of riparian corridors, nutrient enrichment of water bodies, pesticide pollution); (2) **urbanization** (e.g., filling of basins, release of polluted effluent, fragmentation by transportation corridors, toxic waste spills and disposal, isolation of wetlands; (3) **agency activities** (e.g., alteration of watersheds including channelization and creation of sediment basins and for flood control, draining and treatment for mosquito abatement); (4) **resource extraction** (e.g., water extraction and diversion activities, sand and gravel mining in riverbeds, dune swales, and riparian corridors; petroleum extraction impacts and related oil spills); (5) **access** (e.g., impacts from conversion of natural ponds to recreational lakes, trails in marshes and meadows, pet access to breeding sites in wetlands, and vehicular and recreational access to sensitive amphibian breeding sites); and, (6) **introduction of invasive exotic species** such as introduced fox, feral cats and pigs, and Brown-Headed Cowbirds, and many invasive exotic plants that can dominate some habitats to the elimination of native species or associations, including *Arundo donax* (Giant Reed), *Cortaderia jubata* (Pampus Grass), *Senecio mikanioides* (German Ivy), *Pennisetum clandestinum* (Kikuyu Grass), *Crypsis* spp. (Prickle Grass), *Rumex crispus* (Curly Dock), *Carpobrotus edulis* (Hottentot Fig), *Malephora crocea* (Croceum Iceplant), and many others. Cumulative impacts resulting from interactions of individual impacts and the long-term additive effects of various impacts also have contributed to the loss and alteration of palustrine wetlands, for example, at the watershed scale or ecosystem context scale such as in rivers or lakes. Such impacts also affect classification and can result in the development of increased or decreased numbers of wetland types.

Restoration and Creation of Palustrine Wetlands

Enhancement, restoration, recreation, and creation of palustrine wetlands also affects classification because a mechanism to distinguish the natural from artificial sites may be important to establish. Examples of wetlands where ecological restoration has been initiated or planned in the study area and new habitats established include: (1) coastal-terrace vernal pools in Santa Barbara County (Ferren and Pritchett 1988; Ferren and Givertz 1990); mesa vernal pools in San Diego County (e.g., P. Zedler and Scheidlinger 1987; Zedler et al. 1993); and riparian corridors in San Diego County (e.g., Baird and Rieger 1987; Rieger 1988). Although we have not included a way to distinguish manipulated wetlands in our methodology, such information can be provided with the data pages that are associated with the catalogue and illustrated examples.

FIG. IX-7. **SAN LUIS OBISPO CO., ARROYO DE LA CRUZ**. View westward from Highway 1, toward the estuary of Arroyo De La Cruz and the Pacific Ocean. Deforestation by agricultural development has been one of the major impacts to floodplain and terrace forests along riparian corridors of the coastal watersheds of central and southern California. As illustrated here, a palustrine forested wetland dominated by *Salix lasiolepis* (Arroyo Willow) was reduced to nearly one-half its original size to accommodate cattle grazing in the early 1980s.

FIG. IX-8. **RIVERSIDE CO., SAN JACINTO VALLEY, HEMET AREA**. View westward across a vernal wetland plain, toward an artificial channel that drains an extensive area of wetlands. Agricultural development and recent increases in the rate of urbanization has caused the regional vernal plains and vernal pools to become threatened habitats, and has caused the endangerment of various wetland organisms.

Rare and Threatened Palustrine Wetlands

Many special palustrine wetland types were rare in the study region before the extensive losses occurred largely during the last century. As a result of these losses, many additional types of palustrine wetlands are now rare or threatened. We discuss some of these below according to their classes, subclasses, or hydrogeomorphic units.**Vernal Pools.** Vernal wetlands in regions characterized by Mediterranean climates are wetlands that become saturated or flooded as a result of precipitation during the "wet season", particularly winter and early spring, and then become desiccated by the end of spring due to evapotranspiration during the early phase of the "dry season" that occurs in late spring, summer, and into fall. Vernal pools are wetlands that occur in shallow basins that are generally underlain by an impervious subsoil layer (e.g., a "clay pan" or "hard pan") or bedrock outcrop, which produces a seasonally perched water table. Zedler (1987) defines the habitat as follows: "a vernal pool is a natural habitat of the Mediterranean climate region of the Pacific Coast [of North America] covered by shallow water for extended periods during the cool season but completely dry for most of the warm season drought." He has identified four important phases of the habitat cycle: wetting phase, aquatic phase, drying phase, and drought phase.

In southern California, as many as 90% of the vernal pools have been destroyed during the past century. Impacts to these sensitive habitats include: (1) grading, disking, draining, and grazing during agricultural development; (2) large-scale destruction with urbanization of a region; (3) fragmentation by transportation corridors; (4) mosquito abatement impacts; (5) damming or truncation of vernal drainages; (6) invasion by exotic plants; and, (7) recreational access. Many rare and endangered organisms are restricted to vernal pools in California, some of which are found only in particular groupings of pools (e.g., *Pogogyne abramsii* and *Eryngium aristulatum* var. *parishii*, two endangered plants restricted to vernal pools in San Diego County). Thus the few remaining examples of this type of wetland usually provide the habitat function for endangered species.

Vernal Ponds. The origin of vernal ponds, not including seasonal dune swale ponds, is almost exclusively related to structure of the Earth's crust, although there are a few in the study region that apparently have alluvial origins. Ponds such as those at Rancho Las Flores near Los Alamos in Santa Barbara Co. are mostly fault-sag-ponds and are significant because they are breeding sites for two candidate Federal endangered amphibians, Wester Spadefoot Toad and California Tiger Salamander. Elsewhere, the vernal ponds at Sedgwick Ranch in Santa Barbara Co. are breeding sites for Western Toads and support a population of clam shrimp. In contrast, vernal pools in the region, for example coastal-terrace type pools at Ellwood Mesa, Isla Vista, and More Mesa on the south Coast of Santa Barbara Co., do not support toads, salamanders, or clam shrimp,

FIG. IX-9. **SANTA BARBARA CO., VANDENBERG AIR FORCE BASE, SAN ANTONIO TERRACE DUNES.** View northward across a created dune swale wetland, toward the Casmalia Hills. Impacts to wetlands from military development have recently been mitigated through a program of wetland creation and restoration. Post-construction monitoring has revealed a trend toward successful achievement of project goals and the establishment of many ecosystem functions that characterize natural dune swale wetlands.

FIG. IX-10. **SANTA BARBARA CO., ISLA VISTA, DEL SOL OPEN SPACE AND VERNAL POOL RESERVE.** View northward across a recreated vernal pool (foreground) toward the Santa Ynez Mountains. To partially compensate for the historic loss of approximately 90% of the regional vernal pool wetlands, county- and state-funded projects been implemented to enhance, restore, recreate and create vernal pools at Del Sol Reserve, which was established in 1978 as one of the first vernal pool reserves in California. Post-construction monitoring of the various phases of "restoration" have yielded promising results for establishment of plants and use of the manipulated pools by birds. However, planktonic invertebrates and insects have not achieved the richness and densities that mimic natural pools of the region.

but are breeding sites for Pacific Tree Frogs.

Palustrine Vernal Lakes. Vernal wetlands that occur in basins and flood for a longer duration and are larger than vernal pools and ponds, but usually flood for a shorter duration than many freshwater marshes, fall into a category that has been called "vernal lakes". Early investigators for coast survey maps from the mid- to late-19th century often illustrated these lakes as a series of interrupted concentric lines that located a seasonally flooded basin large enough to map, some of which they identified as "lagunitas" (e.g., at Carpinteria in Santa Barbara County). Vernal pools in the coastal district were generally too small to illustrate within the grassland or scrub vegetation within which they occurred or were not recognized by mappers as distinct from this vegetation context. Vernal lake wetlands were apparently rare in southern California before extensive agricultural and urban development took place, and supported plants that are not typical of vernal pool habitat, such as the genera *Alisma, Ammannia, Bergia, Sagittaria*, etc. Today, there are only a few vernal lakes that remain, all of which have been degraded by various impacts, but some of which still provide important functional values.

In Orange County, Upper Laguna Lake has been affected by highway development, grazing, and invasion by *Eucalyptus*; however, it still provides habitat for many regionally rare plant species. In Ventura County, Mirror Lake (Fig. X-11) was largely drained and filled during the 1980s, a process that apparently eliminated the majority of rare plant species, including *Sagittaria sanfordii*, a species of "arrowhead" that was found in southern California only at this locality. Today, Mirror Lake is characterized by degraded freshwater marsh, a few arroyo willows, and only scattered pockets of vegetation that suggests its important historical functions. In Santa Barbara County, Laguna Blanca was known regionally for its rare plants (Smith 1976). Following destruction of the Carpinteria "lagunitas" as a result of agricultural practices and urbanization, Laguna Blanca was the only vernal lake in the south coast district of that County. Today, however, it is maintained as a golf course pond and has a greatly reduced habitat function for rare plant species. It more regularly supports common freshwater-marsh vegetation, contains degraded water as the result of nutrient enrichment, and has an artificially influenced water regime.

Vernal Alkali Plains. Hot interior valleys of large coastal watersheds of central and southern California are often poorly drained by intermittent rivers or streams and are sites with significant rates of evapotranspiration. Valley bottomlands can be desert-like in climate and biota, and the wetland ecosystems of these valleys often are characterized by alkaline and saline soils when they are desiccated. Perhaps the most extensive example in southern California is the San Jacinto Valley, which is drained intermittently by the San Jacinto River. Much of the valley

bottomland is the exposed bed of the prehistoric San Jacinto Lake. Vernal alkali wetlands in this valley (Fig IX-8, IX-39) are quite variable in soil texture, alkalinity, flooding depth and duration, and cover many square miles of nearly contiguous habitat. Within the broader wetland and grassland ecosystem, specific habitats include springs and seeps, alkali plains, vernal pools, and brackish marshes. Dominant species can include coastal salt marsh dominants such as *Arthrocnemum subterminale* (Parish's Glasswort) and *Distichlis spicata*. (Salt Grass). Rare or endangered alkali vernal pool species include *Navarretia fossalis* and others. Extensive agricultural development, draining of wetlands, recreational access, and current rapid urbanization of the region, which includes commercial and residential development on vernal wetland habitat, has seriously reduced the wetlands in the valley and has degraded many examples that remain.

Dune Swale Wetlands. Dune swales are topographically low areas that occur between the crests of coastal dunes. When the dune system is large enough to serve as an aquifer and support a body of fresh water, the dune swales often contain wetland habitat if the bottom of the swale intersects the water table. In southern California, extensive urbanization of the coast has virtually eliminated this habitat. Perhaps the most extensive destruction occurred along the coast of the Oxnard Plain in Ventura County. Examples of the remaining habitats include minor sites on the Silver Strand in San Diego County and portions of the Oxnard Plain within or adjacent to McGrath State Beach. In central California, where urbanization of the coast has not been as extensive there are several extensive dune complexes that support numerous dune swale wetlands, including San Antonio Terrace Dunes (Fig. I-4), Nipomo Dunes, and Guadalupe Dunes. Threats to these dunes systems, however, and the wetlands contained within them, are numerous and potentially serious. Military development at Vandenberg Air Force Base has recently impacted dune swale wetlands, although mitigation measures have been implemented to compensate for losses and other impacts. Historic and current extraction of petrochemicals from within the dune systems, with construction of access roads, pumping stations, pipelines, and support facilities also has had significant impact. Furthermore, the overdraft of ground water basins for agricultural and urban uses, and a recent period of drought, apparently have resulted in the lowering of the water table, preventing many swales from flooding. Reduction in the duration of flooding, elimination of flooding, and conversion of flooding regimes have caused short-term impacts to the ecosystem functions of the wetlands.

Other impacts to the dune systems that also effect the wetlands include recreational activities such as uncontrolled vehicular access, operation of sand quarries, landward migration of disturbed dune systems into dune swale wetlands, growth of invasive exotic plants, and disturbance by feral pigs. Because of the rarity of these wetland habitats in southern California

and the continuing impacts to the wetlands in central California, we include dune swale wetlands among those that are rare and endangered. These wetlands may have minimal functions as habitat for endangered plant species (although they can be habitat for the endangered red-legged frog and other sensitive animals), they have great significance as sites for many native plants (e.g., five species of *Juncus*) that are important to the historic economies of Native American cultures for activities such as basket making. Thus a rather unique socio-economic value must be considered for them.

Coastal Canyon Bottomland. To this point, our discussion and classification of rare and endangered wetlands has included mostly various types of emergent wetlands (i.e., those dominated by herbaceous plants). Many of these wetlands, however, exhibit seasonal saturation or seasonal flooding that is characteristic of many wetlands in this Mediterranean climate. The general conception of freshwater marshes, however, is that they are more typically permanently flooded or intermittently exposed and often support perennial emergent species such as bulrushes (*Scirpus* spp.) and cattails (*Typha* spp.). Although "freshwater marsh" wetlands perhaps were always rare in southern and central California, some are particularly rare and endangered today. One type in central California is the "coastal canyon bottomland" or floodplain HGM restricted to permanently flooded or permanently saturated canyon bottomlands that approximate the level of the water table and that occur near the coast in association with dune and dune lake systems.

The most important example of this type of emergent wetland (and associated aquatic bed, scrub/shrub and forested wetlands) is Black Lake Canyon (Figs. IX-19, IX-20) in San Luis Obispo County (McClelland Engineers, Inc. 1988). Dominant perennial emergent hydrophytes include *Scirpus microcarpus, Sporganium eurycarpum,* and *Typha latifolia*. Special sites within the canyon have well developed organic soils and provide habitat for many plant species of special interest. Of note are endangered species such as *Arenaria poludicola*, which currently is known only from Black Lake Canyon, and *Rorippa gambelii*, which now is apparently restricted to only a few sites in San Luis Obispo County including Black Lake Canyon. Many other species of special interest either reach their southern limits (e.g., the grass *Calamagrostis nutkaensis* and the sedge *Carex cusickii*) or northern limits (e.g., *Cladium californicum*, California Sawgrass) in the canyon vicinity, or are widely scattered in California (e.g., the orchid *Platanthera dilitata*). Impacts to this rare system threaten its functional value as habitat for rare and endangered species. These impacts include extraction of water resources, nutrient enrichment of wetlands, unauthorized access, evapotranspiration by adjacent stands of blue gum (*Eucalyptus globulus*), siltation from disturbed canyon slopes, and proposals to increase residential development (with water wells) in the canyon (McClelland Engineers, Inc., 1988). To help protect this "sensitive resource area", The Nature Conservancy has

obtained portions of it and a management plan has been developed.

Forested Riparian Corridors. Riparian corridors include uplands and palustrine and riverine wetlands along rivers and streams (Figs. IX-49 to IX-56). Within this corridor feature in southern and central California, there can occur riparian forests that grade up slope to upland forests such as Southern Coast Live Oak Forest or Woodland, and grade down slope to a Palustrine Forested Wetland that may include various forest and woodland types such as Central Coast Arroyo Willow Riparian Forest, Southern Arroyo Willow Riparian Forest, Central Coast Cottonwood-Sycamore Riparian Forest, Southern Cottonwood-Willow Riparian Forest, and White Alder Riparian Forest (Holland 1986).

Faber et al. (1989) estimate that as much as 95-97% of the riparian community has been eliminated from floodplain areas of southern California. Extensive clearing of riparian vegetation for agricultural purposes and urbanization of coastal watersheds, in addition to mineral extraction from floodplains and riverbeds and damming of river valleys, has resulted in direct elimination of these forests. Diversion of river and stream flows and the overdrafting of groundwater basins, and growth of invasive exotic plants have caused degradation of those that remain. Such destruction of these natural resources has had significant impacts to the ecosystem functions and socio-economic values of these palustrine forests. Brode and Bury (1984), for example, report that riparian systems provide habitat for 83% of the amphibians and 40% of the reptiles in California. Although many of these animals may be dependent on the riverine wetlands within the riparian corridors, such as *Bufo microcephalus* (Arroyo Toad) that breeds in specific portions of mountains streams, many avian species are dependent on riparian forests for breeding sites. In southern California, the Least Bell's Vireo, a federally-listed endangered species, is now restricted to only a few breeding sites such as along the Santa Clara River in Ventura County. Other rare bird species that are dependent on Palustrine Forested Wetlands in riparian corridors include three species of special interest (Yellow-Breasted Chat, Willow Fly Catcher, and Yellow-Billed Cuckoo) and other riparian dependent species such as the Yellow Warbler. Refer to Section XV, Appendix I - Species of Special Concern for a list of the species of special concern associated with the Palustrine System, including forested wetlands.

CLASSIFICATION OF THE PALUSTRINE WETLANDS

The classification of palustrine wetlands includes: (1) a "Key to the Palustrine Classes"; (2) Table IX-1: "Table of the Hydrogeomorphologic Units Arranged within Corresponding Water Regimes"; (3) "Catalogue of the Palustrine Wetlands"; and, (4) "Description and Illustration of

Selected Marine Wetland Types". See Section III, Classification, for an explanation of the classification methodology and use of the key, table, and catalogue.

Key to the Palustrine Classes (there are no subsystems)

During the growing season of most years, areal cover by vegetation is less than 30%:

Water regimes include seasonally flooded, temporarily flooded, saturated, or artificially flooded; substrate is often a soil.....**Unconsolidated Shore Class**

Water regimes include permanently or semipermanently flooded or intermittently exposed; substrate is usually not a soil:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Bottom Class**

During the growing season of most years, percentage of area covered by vegetation is 30% or greater:

Vegetation composed predominantly of nonvascular plants (e.g., algae or bryophytes):

Vegetation predominantly macrophytic algae, mosses, or lichens in water or the splash zones of shores.....**Aquatic Bed Class**

Vegetation predominantly mosses or lichens usually growing on organic soils and always outside the splash zone of shores.....**Moss-Lichen Wetland Class**

Vegetation composed predominantly of vascular plant species:

Vegetation herbaceous:

Vegetation generally consists of submerged rooted aquatic, floating-leaved, or floating types (e.g., *Najas, Potamogeton, Myriophyllum*)..**Aquatic Bed Class**

Vegetation dominated by emergent types:

Vegetation composed of pioneering annuals, nonpersistent perennials, or seedlings of perennials that often are not hydrophytes and occur only at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.....**Unconsolidated Shore (Vegetated) Class**

Vegetation predominantly perennials or nonpersistent hydrophyte

species occurring in natural, restored, or recreated habitats.....
.....**Emergent Wetland Class**

Vegetation shrubs or trees:

Dominants plants generally less then 5 meters (15 feet) tall.....
.....**Scrub-Shrub Wetland Class**

Dominants plants generally 5 meters (15 feet) tall or taller.....
.....**Woodland and Forested Wetland Class**

Table IX-1. **TABLE OF HYDROGEOMORPHIC UNITS IN THE PALUSTRINE SYSTEM ARRANGED WITHIN CORRESPONDING WATER REGIMES.**

("00") = Water Regime
(00."0") = Water Chemistry
(00.0."000") = Hydrogeomorphic Unit
(00.0.000."0000") = Substrate/Dominance/Characteristic Type

(20.0) NONTIDAL WATER REGIMES (Riverine, Lacustrine, and Palustrine Systems)

(21.0) PERMANENTLY-FLOODED NONTIDAL REGIME

(21.0.100.0000) Water Bodies (Hydrogeomorphic Context)

(21.0.130) Springs
(21.0.131) Cold Springs
(21.0.132) Hot Springs

(21.0.140) Palustrine Ponds, Lakes, Reservoirs
(21.0.141) Dune Ponds ("Lakes")
(21.0.142) Coastal Ponds
(21.0.143) Fault Sag Ponds
(21.0.144) Glacial Ponds ("Lakes")
(21.0.147) Agricultural Ponds, Reservoirs
(21.0.148) Recreational Ponds, Reservoirs

(21.0.150) Lacustrine Lakes/Reservoirs
(21.0.154) Montane Reservoirs
(21.0.155) River-Valley Reservoirs
(21.0.156) Canyon Reservoirs

(21.0.160) Streams
(21.0.161) Montane Streams
(21.0.162) Foothill/Terrace Streams
(21.0.163) Valley Streams
(21.0.164) Coastal-Plain Streams
(21.0.165) Canyon Streams

(21.0.170) Rivers
(21.0.171) Montane Rivers
(21.0.172) Foothill Rivers
(21.0.173) Valley Rivers
(21.0.174) Coastal-Plain Rivers
(21.0.175) Canyon Rivers

(21.0.180) Drainages
(21.0.181) Montane Drainages

(Table IX-1 Continued)

(21.0.182) Coastal Canyon Drainages

(21.0.200.0000) Channels, Drainages, Inverts, Falls

(21.0.210) Stream Channels
(21.0.211) Montane Stream Channels
(21.0.212) Foothill/Terrace Stream Channels
(21.0.213) Valley Stream Channels
(21.0.214) Coastal-Plain Stream Channels
(21.0.215) Canyon Stream Channels

(21.0.220) River Channels
(21.0.221) Montane River Channels
(21.0.222) Foothill River Channels
(21.0.223) Valley River Channels
(21.0.224) Coastal-Plain River Channels
(21.0.225) Canyon River Channels

(21.0.230) Backbar Channels
(21.0.231) Stream Backbar Channels
(21.0.232) River Backbar Channels

(21.0.240) Drainage Channels

(21.0.260) Falls
(21.0.261) Montane Stream Falls
(21.0.262) Foothill Stream Falls
(21.0.263) Montane River Falls
(21.0.264) Foothill River Falls

(21.0.270) Lacnstrine Channels

(21.0.280) Artificial Ditches

(21.0.300.0000) Shores, Beaches, Banks, Margins

(21.0.400.0000) Beds, Bottoms, Bars

(21.0.420) Palustrine Pond Beds/Bottoms
(21.0.421) Dune Pond ("Lake") Beds/Bottoms
(21.0.422) Coastal Pond Beds/Bottoms
(21.0.423) Fault Sag Pond Beds/Bottoms
(21.0.424) Glacial Pond ("Lake") Beds/Bottoms
(21.0.426) Agricultural Pond/Reservoir Beds/Bottoms
(21.0.427) Recreational Pond/Reservoir Beds/Bottoms

(21.0.430) Palustrine Lake Beds/Bottoms
(21.0.432) Palustrine Perennial Lake Beds/Bottoms
(21.0.433) Palustrine Agricultural Lake Beds/Bottoms
(21.0.434) Palustrine Recreational Lake/Reservoir Beds/Bottoms

(Table IX-1 Continued)

(21.0.440) Lacustrine Lake/Reservoir Beds/Bottoms
- (21.0.444) Montane Reservoir Beds/Bottoms
- (21.0.445) River Reservoir Beds/Bottoms
- (21.0.446) Canyon Reservoir Beds/Bottoms

(21.0.450) Stream Beds/Bottoms
- (21.0.451) Montane Streambeds
- (21.0.452) Foothill/Terrace Streambeds
- (21.0.453) Valley Streambeds
- (21.0.454) Coastal-Plain Streambeds
- (21.0.455) Canyon Streambeds

(21.0.460) River Beds/Bottoms
- (21.0.461) Montane Riverbeds
- (21.0.462) Foothill Riverbeds
- (21.0.463) Valley Riverbeds
- (21.0.464) Coastal-Plain Riverbeds
- (21.0.465) Canyon Riverbeds

(21.0.470) Stream-Channel Bars
- (21.0.471) Montane Stream-Channel Bars
- (21.0.472) Foothill/Terrace Stream-Channel Bars
- (21.0.473) Valley Stream-Channel Bars
- (21.0.474) Coastal-Plain Stream-Channel Bars
- (21.0.475) Canyon Stream-Channel Bars

(21.0.480) River-Channel Bars
- (21.0.481) Montane River-Channel Bars
- (21.0.482) Foothill River-Channel Bars
- (21.0.483) Valley River-Channel Bars
- (21.0.484) Coastal-Plain River-Channel Bars
- (21.0.485) Canyon River-Channel Bars

(21.0.490) Lake Bars

(21.0.500.0000) Flats, Plains, Fans, Washes, Bottomlands, Terraces

(21.0.530) Deltas
- (21.0.531) Stream Deltas
- (21.0.532) River Deltas
- (21.0.533) Coastal Deltas
- (21.0.534) Lake Deltas

(21.0.550) Floodplains, Bottomlands
- (21.0.551) Stream Floodplains, Bottomlands
- (21.0.552) River Floodplains, Bottomlands
- (21.0.553) Canyon Floodplains, Bottomlands
- (21.0.554) Montane Floodplains, Bottomlands

(21.0.600.0000) Headlands, Bluffs, Slopes

(Table IX-1 Continued)

(21.0.700.0000) Seeps, Springs

(21.0.720) Springs
(21.0.721) Drainage-Head Springs
(21.0.722) Bluff and Slope Springs
(21.0.723) Canyon Springs
(21.0.724) Stream Bank/Bed Springs
(21.0.725) River Bank/Bed Springs
(21.0.726) Montane Springs
(21.0.727) Foothill Springs
(21.0.728) Valley and Plain Springs
(21.0.729) Lake Springs

(21.0.730) Hot Springs

(21.0.750) Artificial Springs

(21.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(21.0.820) Palustrine Ponds, Lakes
(21.0.821) Dune Ponds ("Lakes")
(21.0.822) Coastal Ponds
(21.0.823) Fault Sag Ponds
(21.0.824) Glacial Ponds ("Lakes")
(21.0.827) Agricultural Ponds
(21.0.828) Recreational Ponds

(21.0.840) Marshes
(21.0.842) Freshwater Marshes
(21.0.843) Alkali Marshes
(21.0.844) Haline Marshes

(21.0.850) Swales
(21.0.851) Montane Drainage Swales
(21.0.852) Coastal Terrace Drainage Swales
(21.0.853 Dune Swales
(21.0.854) Artificial Drainage Swales

(21.0.900.000) Artificial Structures

(21.0.910) Stationary Artificial Structures
(21.0.911) Jetties/Breakwaters
(21.0.912) Bank Revetments
(21.0.913) Dams/Levees
(21.0.914) Earthen Berms/Dikes
(21.0.915) Dredge Spoils
(21.0.916) Pilings/Piers
(21.0.917) Platforms
(21.0.918) Boat Ramps

(Table IX-1 Continued)

(21.0.919) Wreckage

(21.0.920) Floating Artificial Structures
(21.0.921) Hulls
(21.0.922) Docks
(21.0.923) Buoys
(21.0.924) Logs

(22.0) INTERMITTENTLY-EXPOSED NONTIDAL REGIME (also see Regime 21.0, 23.0)

(22.0.100.0000) Water Bodies (Hydrogeomorphic Context)

(22.0.130) Springs
(22.0.131) Cold Springs
(22.0.132) Hot Springs

(22.0.140) Palustrine Ponds, Lakes, Reservoirs
(22.0.141) Dune Ponds ("Lakes")
(22.0.142) Coastal Ponds
(22.0.143) Fault Sag Ponds
(22.0.144) Glacial Ponds ("Lakes")
(22.0.147) Agricultural Ponds, Reservoirs
(22.0.148) Recreational Ponds, Reservoirs

(22.0.150) Lacustrine Lakes/Reservoirs
(22.0.154) Montane Reservoirs
(22.0.155) River-Valley Reservoirs
(22.0.156) Canyon Reservoirs

(22.0.160) Streams
(22.0.161) Montane Streams
(22.0.162) Foothill/Terrace Streams
(22.0.163) Valley Streams
(22.0.164) Coastal-Plain Streams
(22.0.165) Canyon Streams

(22.0.170) Rivers
(22.0.171) Montane Rivers
(22.0.172) Foothill Rivers
(22.0.173) Valley Rivers
(22.0.174) Coastal-Plain Rivers
(22.0.175) Canyon Rivers

(22.0.180) Drainages
(22.0.181) Montane Drainages
(22.0.182) Coastal Canyon Drainages

(Table IX-1 Continued)

(22.0.200.0000) Channels, Drainages, Inverts, Falls

(22.0.210) Stream Channels
(22.0.211) Montane Stream Channels
(22.0.212) Foothill/Terrace Stream Channels
(22.0.213) Valley Stream Channels
(22.0.214) Coastal-Plain Stream Channels
(22.0.215) Canyon Stream Channels

(22.0.220) River Channels
(22.0.221) Montane River Channels
(22.0.222) Foothill River Channels
(22.0.223) Valley River Channels
(22.0.224) Coastal-Plain River Channels
(22.0.224) Canyon River Channels

(22.0.230) Backbar Channels
(22.0.231) Stream Backbar Channels
(22.0.232) River Backbar Channels

(22.0.240) Drainage Channels

(22.0.270) Lacustrine Channels

(22.0.280) Artificial Ditches

(22.0.300.0000) Shores, Beaches, Banks, Margins

(22.0.400.0000) Beds, Bottoms, Bars

(22.0.420) Palustrine Pond Beds/Bottoms
(22.0.421) Dune Pond ("Lake") Beds/Bottoms
(22.0.422) Coastal Pond Beds/Bottoms
(22.0.423) Fault Sag Pond Beds/Bottoms
(22.0.424) Glacial Pond ("Lake") Beds/Bottoms
(22.0.426) Agricultural Pond/Reservoir Beds/Bottoms
(22.0.427) Recreational Pond/Reservoir Beds/Bottoms

(22.0.430) Palustrine Lake Beds/Bottoms
(22.0.432) Palustrine Perennial Lake Beds/Bottoms
(22.0.433) Palustrine Agricultural Lake Beds/Bottoms
(22.0.434) Palustrine Recreational Lake/Reservoir Beds/Bottoms

(22.0.440) Lacustrine Lake/Reservoir Beds/Bottoms
(22.0.444) Montane Reservoir Beds/Bottoms
(22.0.445) River Reservoir Beds/Bottoms
(22.0.446) Canyon Reservoir Beds/Bottoms

(22.0.450) Stream Beds/Bottoms
(22.0.451) Montane Streambeds
(22.0.452) Foothill/Terrace Streambeds

(Table IX-1 Continued)

(22.0.453) Valley Streambeds
(22.0.454) Coastal-Plain Streambeds
(22.0.455) Canyon Streambeds

(22.0.460) River Beds/Bottoms
(22.0.461) Montane Riverbeds
(22.0.462) Foothill Riverbeds
(22.0.463) Valley Riverbeds
(22.0.464) Coastal-Plain Riverbeds
(22.0.465) Canyon Riverbeds

(22.0.470) Stream-Channel Bars
(22.0.471) Montane Stream-Channel Bars
(22.0.472) Foothill/Terrace Stream-Channel Bars
(22.0.473) Valley Stream-Channel Bars
(22.0.474) Coastal-Plain Stream-Channel Bars

(22.0.480) River-Channel Bars
(22.0.481) Montane River-Channel Bars
(22.0.482) Foothill River-Channel Bars
(22.0.483) Valley River-Channel Bars
(22.0.484) Coastal-Plain River-Channel Bars
(22.0.485) Canyon River-Channel Bars

(22.0.490) Lake Bars

(22.0.500.0000) Flats, Plains, Fans, Washes, Bottomlands, Terraces

(22.0.530) Deltas
(22.0.531) Stream Deltas
(22.0.532) River Deltas
(22.0.533) Coastal Deltas
(22.0.534) Lake Deltas

(22.0.550) Floodplains, Bottomlands
(22.0.551) Stream Floodplains, Bottomlands
(22.0.552) River Floodplains, Bottomlands
(22.0.553) Canyon Floodplains, Bottomlands
(22.0.554) Montane Floodplains, Bottomlands

(22.0.600.0000) Headlands, Bluffs, Slopes

(22.0.700.0000) Seeps, Springs

(22.0.720) Springs
(22.0.721) Drainage-Head Springs
(22.0.722) Bluff and Slope Springs
(22.0.723) Canyon Springs
(22.0.724) Stream Bank/Bed Springs

(Table IX-1 Continued)

(22.0.725) River Bank/Bed Springs
(22.0.726) Montane Springs
(22.0.727) Foothill Springs
(22.0.728) Valley and Plain Springs
(22.0.729) Lake Springs

(22.0.730) Hot Springs

(22.0.750) Artificial Springs

(22.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(22.0.820) Palustrine Ponds, Lakes
(22.0.821) Dune Ponds ("Lakes")
(22.0.822) Coastal Ponds
(22.0.823) Fault Sag Ponds
(22.0.824) Glacial Ponds ("Lakes")
(22.0.827) Agricultural Ponds
(22.0.828) Recreational Ponds

(22.0.830) Meadows
(22.0.832) Montane Perennial Meadows

(22.0.840) Marshes
(22.0.842) Freshwater Marshes
(22.0.843) Alkali Marshes
(22.0.844) Haline Marshes

(22.0.850) Swales
(22.0.851) Montane Drainage Swales
(22.0.852) Coastal Terrace Drainage Swales

(22.0.900.000) Artificial Structures

(22.0.910) Stationary Artificial Structures
(22.0.911) Jetties/Breakwaters
(22.0.912) Bank Revetments
(22.0.913) Dams/Levees
(22.0.914) Earthen Berms/Dikes
(22.0.915) Dredge Spoils
(22.0.916) Pilings/Piers
(22.0.917) Platforms
(22.0.918) Boat Ramps
(22.0.919) Wreckage

(22.0.920) Floating Artificial Structures
(22.0.921) Hulls
(22.0.922) Docks

(Table IX-1 Continued)

(22.0.923) Buoys
(22.0.924) Logs

(23.0) SEMIPERMANENTLY-FLOODED NONTIDAL REGIME (also see Regime 21.0, 22.0)

(23.0.100.0000) Water Bodies (Hydrogeomorphic Context)

(23.0.130) Springs
(23.0.131) Cold Springs
(23.0.132) Hot Springs

(23.0.140) Palustrine Ponds, Lakes, Reservoirs
(23.0.141) Dune Ponds ("Lakes")
(23.0.142) Coastal Ponds
(23.0.143) Fault Sag Ponds
(23.0.144) Glacial Ponds ("Lakes")
(23.0.147) Agricultural Ponds, Reservoirs
(23.0.148) Recreational Ponds, Reservoirs

(23.0.150) Lacustrine Lakes/Reservoirs
(23.0.154) Montane Reservoirs
(23.0.155) River-Valley Reservoirs
(23.0.156) Canyon Reservoirs

(23.0.160) Streams
(23.0.161) Montane Streams
(23.0.162) Foothill/Terrace Streams
(23.0.163) Valley Streams
(23.0.164) Coastal-Plain Streams
(23.0.165) Canyon Streams

(23.0.170) Rivers
(23.0.171) Montane Rivers
(23.0.172) Foothill Rivers
(23.0.173) Valley Rivers
(23.0.174) Coastal-Plain Rivers
(23.0.175) Canyon Rivers

(23.0.180) Drainages
(23.0.181) Montane Drainages
(23.0.182) Coastal Canyon Drainages

(23.0.200.0000) Channels, Drainages, Inverts, Falls

(23.0.210) Stream Channels
(23.0.211) Montane Stream Channels
(23.0.212) Foothill/Terrace Stream Channels
(23.0.213) Valley Stream Channels

(Table IX-1 Continued)

(23.0.214) Coastal-Plain Stream Channels
(23.0.215) Canyon Stream Channels

(23.0.220) River Channels
(23.0.221) Montane River Channels
(23.0.222) Foothill River Channels
(23.0.223) Valley River Channels
(23.0.224) Coastal-Plain River Channels
(23.0.225) Canyon River Channels

(23.0.230) Backbar Channels
(23.0.231) Stream Backbar Channels
(23.0.232) River Backbar Channels

(23.0.240) Drainage Channels
(23.0.242) Montane Drainage Channels

(23.0.260) Falls
(23.0.261) Montane Stream Falls
(23.0.262) Foothill Stream Falls
(23.0.263) Montane River Falls
(23.0.264) Foothill River Falls

(23.0.270) Lacustrine Channels

(23.0.280) Artificial Ditches

(23.0.300.000) Beaches, Shores, Banks, Margins

(23.0.310) Palustrine Pond Shores
(23.0.311) Dune Pond Shores
(23.0.312) Coastal Pond Shores
(23.0.313) Fault Sag Pond Shores
(23.0.314) Glacial Pond ("Lake") Shores
(23.0.315) Vernal Pond Shores
(23.0.316) Agricultural Pond Shores
(23.0.317) Recreational Pond Shores

(23.0.320) Palustrine Lake/Reservoir Shores
(24.0.321) Vernal Palustrine-Lake Shores
(24.0.322) Agricultural Palustrine-Lake Shores
(24.0.323) Recreational Palustrine-Lake Shores

(23.0.330) Lacustrine Lake/Reservoir Shores
(24.0.331) Montane Freshwater Lacustrine-Lake Shores
(24.0.332) Montane Alkali Lacustrine-Lake Shores
(24.0.333) Playa Lake Shores
(24.0.334) Montane Reservoir Shores
(24.0.335) River Reservoir Shores
(24.0.336) Canyon Reservoir Shores

(Table IX-1 Continued)

(23.0.340) Stream Shores
- (23.0.341) Montane Stream-Shores
- (23.0.342) Foothill/Terrace Stream-Shores
- (23.0.343) Valley Stream-Shores
- (23.0.344) Coastal-Plain Stream-Shores
- (23.0.345) Canyon Stream-Shores

(23.0.350) River Shores
- (23.0.351) Montane River-Shores
- (23.0.352) Foothill River-Shores
- (23.0.353) Valley River-Shores
- (23.0.354) Coastal-Plain River-Shores
- (23.0.355) Canyon River-Shores

(23.0.400.0000) Beds, Bottoms, Bars

(23.0.420) Palustrine Pond Beds/Bottoms
- (23.0.421) Dune Pond ("Lake") Beds/Bottoms
- (23.0.422) Coastal Pond Beds/Bottoms
- (23.0.423) Fault Sag Pond Beds/Bottoms
- (23.0.424) Glacial Pond ("Lake") Beds/Bottoms
- (23.0.426) Agricultural Pond/Reservoir Beds/Bottoms
- (23.0.427) Recreational Pond/Reservoir Beds/Bottoms

(23.0.430) Palustrine Lake Beds/Bottoms
- (23.0.432) Palustrine Perennial Lake Beds/Bottoms
- (23.0.433) Palustrine Agricultural Lake Beds/Bottoms
- (23.0.434) Palustrine Recreational Lake/Reservoir Beds/Bottoms

(23.0.440) Lacustrine Lake/Reservoir Beds/Bottoms
- (23.0.444) Montane Reservoir Beds/Bottoms
- (23.0.445) River Reservoir Beds/Bottoms
- (23.0.446) Canyon Reservoir Beds/Bottoms

(23.0.450) Stream Beds/Bottoms
- (23.0.451) Montane Streambeds
- (23.0.452) Foothill/Terrace Streambeds
- (23.0.453) Valley Streambeds
- (23.0.454) Coastal-Plain Streambeds
- (23.0.455) Canyon Streambeds

(23.0.460) River Beds/Bottoms
- (23.0.461) Montane Riverbeds
- (23.0.462) Foothill Riverbeds
- (23.0.463) Valley Riverbeds
- (23.0.464) Coastal-Plain Riverbeds
- (23.0.465) Canyon Riverbeds

(23.0.470) Stream-Channel Bars
- (23.0.471) Montane Stream-Channel Bars
- (23.0.472) Foothill/Terrace Stream-Channel Bars

(Table IX-1 Continued)

(23.0.473) Valley Stream-Channel Bars
(23.0.474) Coastal-Plain Stream-Channel Bars
(23.0.475) Canyon Stream-Channel Bars

(23.0.480) River-Channel Bars
(23.0.481) Montane River-Channel Bars
(23.0.482) Foothill River-Channel Bars
(23.0.483) Valley River-Channel Bars
(23.0.484) Coastal-Plain River-Channel Bars
(23.0.485) Canyon River-Channel Bars

(23.0.490) Lake Bars

(23.0.500.0000) Flats, Plains, Fans, Washes, Bottomlands, Terraces

(23.0.530) Deltas
(23.0.531) Stream Deltas
(23.0.532) River Deltas
(23.0.533) Coastal Deltas
(23.0.534) Lake Deltas

(23.0.550) Floodplains, Bottomlands
(23.0.551) Stream Floodplains, Bottomlands
(23.0.552) River Floodplains, Bottomlands
(23.0.553) Canyon Floodplains, Bottomlands
(23.0.554) Montane Floodplains, Bottomlands

(23.0.600.0000) Headlands, Bluffs, Slopes

(23.0.700.0000) Seeps, Springs

(23.0.720) Springs
(23.0.721) Drainage-Head Springs
(23.0.722) Bluff and Slope Springs
(23.0.723) Canyon Springs
(23.0.724) Stream Bank/Bed Springs
(23.0.725) River Bank/Bed Springs
(23.0.726) Montane Springs
(23.0.727) Foothill Springs
(23.0.728) Valley and Plain Springs
(23.0.729) Lake Springs

(23.0.730) Hot Springs

(23.0.750) Artificial Springs

(23.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(Table IX-1 Continued)

(23.0.820) Palustrine Ponds, Lakes
(23.0.821) Dune Ponds ("Lakes")
(23.0.822) Coastal Ponds
(23.0.823) Fault Sag Ponds
(23.0.824) Glacial Ponds ("Lakes")
(23.0.827) Agricultural Ponds
(23.0.828) Recreational Ponds

(23.0.830) Meadows
(23.0.832) Montane Perennial Meadows

(23.0.840) Marshes
(23.0.842) Freshwater Marshes
(23.0.843) Alkali Marshes
(23.0.844) Haline Marshes
(23.0.848) Diked Estuarine Marshes

(23.0.850) Swales
(23.0.851) Montane Drainage Swales
(23.0.852) Coastal Terrace Drainage Swales
(23.0.853 Dune Swales
(23.0.854) Artificial Drainage Swales

(23.0.900.0000) Artificial Structures

(23.0.910) Stationary Artificial Structures
(23.0.911) Jetties/Breakwaters
(23.0.912) Bank Revetments
(23.0.913) Dams/Levees
(23.0.914) Earthen Berms/Dikes
(23.0.915) Dredge Spoils
(23.0.916) Pilings/Piers
(23.0.917) Platforms
(23.0.918) Boat Ramps
(23.0.919) Wreckage

(23.0.920) Floating Artificial Structures
(23.0.921) Hulls
(23.0.922) Docks
(23.0.923) Buoys
(23.0.924) Logs

(24.0) SEASONALLY-FLOODED NONTIDAL REGIME

(24.0.100.0000) Water Bodies (Hydrogeomorphic Context)

(24.0.110) Pools
(24.0.111) Vernal Pools
(24.0.112) Tenajas

(Table IX-1 Continued)

(24.0.130) Springs
- (24.0.131) Cold Springs
- (24.0.132) Hot Springs

(24.0.140) Palustrine Ponds, Lakes, Reservoirs
- (24.0.141) Dune Ponds ("Lakes")
- (24.0.142) Coastal Ponds
- (24.0.143) Fault Sag Ponds
- (24.0.144) Glacial Ponds ("Lakes")
- (24.0.145) Vernal Ponds
- (24.0.146) Palustrine Vernal Lakes
- (24.0.147) Agricultural Ponds, Reservoirs
- (24.0.148) Recreational Ponds, Reservoirs
- (24.0.149) Diked Estuarine Basins

(24.0.180) Drainages
- (24.0.181) Montane Drainages
- (24.0.182) Coastal Canyon Drainages

(24.0.200.0000) Channels, Drainages, Inverts, Falls

(24.0.210) Stream Channels
- (24.0.211) Montane Stream Channels
- (24.0.212) Foothill/Terrace Stream Channels
- (24.0.213) Valley Stream Channels
- (24.0.215) Coastal-Plain Stream Channels
- (24.0.216) Canyon Stream Channels

(24.0.220) River Channels
- (24.0.221) Montane River Channels
- (24.0.222) Foothill River Channels
- (24.0.223) Valley River Channels
- (24.0.225) Coastal Plain River Channels
- (24.0.226) Canyon River Channels

(24.0.230) Backbar Channels
- (24.0.231) Stream Backbar Channels
- (24.0.232) River Backbar Channels

(24.0.240) Drainage Channels
- (24.0.241) Vernal Drainage Channels

(24.0.250) Inverts
- (24.0.251) Montane Drainage Inverts

(24.0.260) Falls
- (24.0.261) Montane Stream Falls
- (24.0.262) Foothill Stream Falls
- (24.0.263) Montane River Falls
- (24.0.264) Foothill River Falls

(Table IX-1 Continued)

(24.0.280) Artificial Ditches

(24.0.300.0000) Beaches, Shores, Banks, Margins

(24.0.310) Palustrine Pond Shores
- (24.0.311) Dune Pond Shores
- (24.0.312) Coastal Pond Shores
- (24.0.313) Fault Sag Pond Shores
- (24.0.314) Glacial Pond ("Lake") Shores
- (24.0.315) Vernal Pond Shores
- (24.0.316) Agricultural Pond Shores
- (24.0.317) Recreational Pond Shores

(24.0.320) Palustrine Lake/Reservoir Shores
- (24.0.321) Vernal Palustrine-Lake Shores
- (24.0.322) Agricultural Palustrine-Lake Shores
- (24.0.323) Recreational Palustrine-Lake Shores

(24.0.330) Lacustrine Lake/Reservoir Shores
- (24.0.331) Montane Freshwater Lacustrine-Lake Shores
- (24.0.332) Montane Alkali Lacustrine-Lake Shores
- (24.0.333) Playa Lake Shores
- (24.0.334) Montane Reservoir Shores
- (24.0.335) River Reservoir Shores
- (24.0.336) Canyon Reservoir Shores

(24.0.340) Stream Shores
- (24.0.341) Montane Stream-Shores
- (24.0.342) Foothill/Terrace Stream-Shores
- (24.0.343) Valley Stream-Shores
- (24.0.344) Coastal-Plain Stream-Shores
- (24.0.345) Canyon Stream-Shores

(24.0.350) River Shores
- (24.0.351) Montane River-Shores
- (24.0.352) Foothill River-Shores
- (24.0.353) Valley River-Shores
- (24.0.354) Coastal-Plain River-Shores
- (24.0.355) Canyon River-Shores

(24.0.370) Stream Banks
- (24.0.371) Montane Stream-Banks
- (24.0.372) Foothill/Terrace Stream-Banks
- (24.0.373) Valley Stream-Banks
- (24.0.374) Coastal-Plain Stream-Banks
- (24.0.374) Canyon Stream-Banks

(24.0.380) River Banks
- (24.0.381) Montane River-Banks
- (24.0.382) Foothill River-Banks
- (24.0.383) Valley River-Banks

(Table IX-1 Continued)

(24.0.384) Coastal-Plain River-Banks
(24.0.385) Canyon River-Banks

(24.0.390) Margins
(24.0.391) Stream Margins
(24.0.392) River Margins
(24.0.393) Estuary Margins
(24.0.394) Pool Margins
(24.0.395) Pond Margins
(24.0.396) Swale Margins
(24.0.397) Lake Margins
(24.0.398) Seep, Spring Margins
(24.0.399) Meadow, Marsh Margins

(24.0.400.0000) Beds, Bottoms, Bars

(24.0.410) Pool Beds/Bottoms
(24.0.411) Vernal Pool Beds/Bottoms
(24.0.412) Tanaja Beds/Bottoms

(24.0.420) Palustrine Pond Beds/Bottoms
(24.0.421) Dune Pond ("Lake") Beds/Bottoms
(24.0.422) Coastal Pond Beds/Bottoms
(24.0.423) Fault Sag Pond Beds/Bottoms
(24.0.424) Glacial Pond ("Lake") Beds/Bottoms
(24.0.425) Vernal Pond Beds/Bottoms
(24.0.426) Agricultural Pond/Reservoir Beds/Bottoms
(24.0.427) Recreational Pond/Reservoir Beds/Bottoms

(24.0.430) Palustrine Lake Beds/Bottoms
(24.0.431) Palustrine Vernal Lake Beds/Bottoms
(24.0.432) Palustrine Perennial Lake Beds/Bottoms
(24.0.433) Palustrine Agricultural Lake Beds/Bottoms
(24.0.434) Palustrine Recreational Lake/Reservoir Beds/Bottoms

(24.0.440) Lacustrine Lake/Reservoir Beds/Bottoms
(24.0.441) Montane Freshwater Lake Beds/Bottoms
(24.0.442) Montane Alkali Lake Beds/Bottoms
(24.0.443) Playa Lake Beds/Bottoms
(24.0.444) Montane Reservoir Beds/Bottoms
(24.0.445) River Reservoir Beds/Bottoms
(24.0.446) Canyon Reservoir Beds/Bottoms

(24.0.450) Stream Beds/Bottoms
(24.0.451) Montane Streambeds
(24.0.452) Foothill/Terrace Streambeds
(24.0.453) Valley Streambeds
(24.0.454) Coastal Plain Streambeds
(24.0.455) Canyon Streambeds

(Table IX-1 Continued)

(24.0.460) River Beds/Bottoms
- (24.0.461) Montane Riverbeds
- (24.0.462) Foothill Riverbeds
- (24.0.463) Valley Riverbeds
- (24.0.464) Coastal-Plain Riverbeds
- (24.0.465) Canyon Riverbeds

(24.0.470) Stream-Channel Bars
- (24.0.471) Montane Stream-Channel Bars
- (24.0.472) Foothill/Terrace Stream-Channel Bars
- (24.0.473) Valley Stream-Channel Bars
- (24.0.474) Coastal-Plain Stream-Channel Bars
- (24.0.475) Canyon Stream-Channel Bars

(24.0.480) River-Channel Bars
- (24.0.481) Montane River-Channel Bars
- (24.0.482) Foothill River-Channel Bars
- (24.0.483) Valley River-Channel Bars
- (24.0.484) Coastal-Plain River-Channel Bars
- (24.0.485) Canyon River-Channel Bars

(24.0.490) Lake Bars

(24.0.500.0000) Flats, Plains, Fans, Washes, Bottomlands, Terraces

(24.0.510) Flats
- (24.0.511) Vernal Flats

(24.0.520) Plains
- (24.0.521) Coastal Plains
- (24.0.522) Montane-Valley Vernal Plains
- (24.0.523) Alkali Vernal Plains
- (24.0.524) Haline Vernal Plains

(24.0.530) Deltas
- (24.0.531) Stream Deltas
- (24.0.532) River Deltas
- (24.0.533) Coastal Deltas
- (24.0.534) Lake Deltas

(24.0.540) Washes
- (24.0.541) Stream Washes
- (24.0.542) River Washes
- (24.0.543) Desert Washes

(24.0.550) Floodplains, Bottomlands
- (24.0.551) Stream Floodplains, Bottomlands
- (24.0.552) River Floodplains, Bottomlands
- (24.0.553) Canyon Floodplains, Bottomlands

(Table IX-1 Continued)

(24.0.554) Montane Floodplains, Bottomlands

(24.0.560) Terraces
(24.0.561) River Terraces
(24.0.562) Stream Terraces
(24.0.563) Valley Terraces
(24.0.564) Coastal Terraces

(24.0.600.0000) Headlands, Bluffs, Slopes, Fans

(24.0.630) Slopes
(24.0.631) Coastal Plain Slopes
(24.0.632) Canyon Slopes
(24.0.633) Foothill Slopes
(24.0.634) Montane Slopes

(24.0.640) Alluvial Fans
(24.0.641) Montane Alluvial Fans
(24.0.642) Foothill Alluvial Fans
(24.0.643) Valley Alluvial fans

(24.0.700.0000) Seeps, Springs

(24.0.720) Springs
(24.0.721) Drainage Head Springs
(24.0.722) Bluff Springs
(24.0.723) Canyon Springs
(24.0.724) Stream Bank/Bed Springs
(24.0.725) River Bank/Bed Springs
(24.0.726) Montane Springs
(24.0.727) Foothill Springs
(24.0.728) Valley and Plain Springs
(24.0.729) Lake Springs

(24.0.730) Hot Springs

(24.0.750) Artificial Springs

(24.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(24.0.810) Vernal Pools
(24.0.811) Coastal-Terrace Vernal Pools
(24.0.812) Mesa Vernal Pools
(24.0.813) River-Terrace Vernal Pools
(24.0.814) Coastal-Valley Vernal Pools
(24.0.815) Foothill-Valley Vernal Pools
(24.0.816) Montane-Plateau Vernal Pools

(Table IX-1 Continued)

(24.0.820) Palustrine Ponds, Lakes
- (24.0.821) Dune Ponds ("Lakes")
- (24.0.822) Coastal Ponds
- (24.0.823) Fault Sag Ponds
- (24.0.824) Glacial Ponds ("Lakes")
- (24.0.825) Vernal Ponds
- (24.0.826) Palustrine Vernal Lakes
- (24.0.827) Agricultural Ponds
- (24.0.828) Recreational Ponds

(24.0.830) Meadows
- (24.0.831) Montane Vernal Meadows
- (24.0.832) Montane Perennial Meadows

(24.0.840) Marshes
- (24.0.841) Vernal Freshwater Marshes
- (24.0.842) Perennial Freshwater Marshes
- (24.0.843) Alkali Marshes
- (24.0.844) Haline Marshes
- (24.0.845) Stream-Channel Marshes
- (24.0.846) River-Channel Marshes
- (24.0.847) Lake-Shore Marshes
- (24.0.848) Diked Estuarine Marshes

(24.0.850) Swales
- (24.0.851) Montane Drainage Swales
- (24.0.852) Coastal Terrace Drainage Swales
- (24.0.853) Dune Swales
- (24.0.854) Artificial Drainage Swales

(24.0.900.0000) Artificial Structures

(24.0.910) Stationary Artificial Structures
- (24.0.911) Jetties/Breakwaters
- (24.0.912) Bank Revetments
- (24.0.913) Dams/Levees
- (24.0.914) Earthen Berms/Dikes
- (24.0.915) Dredge Spoils
- (24.0.916) Pilings/Piers
- (24.0.917) Platforms
- (24.0.918) Boat Ramps
- (24.0.919) Wreckage

(24.0.920) Floating Artificial Structures
- (24.0.921) Hulls
- (24.0.922) Docks
- (24.0.923) Buoys
- (24.0.924) Logs

(Table IX-1 Continued)

(25.0) PERMANENTLY-SATURATED NONTIDAL REGIME

(25.0.100.0000) Water Bodies (Hydrogeomorphic Context)

(25.0.200.0000) Channels, Drainages, Inverts, Falls

(25.0.300.0000) Shores, Beaches, Banks, Margins

(25.0.370) Stream Banks
(25.0.371) Montane Stream-Banks
(25.0.372) Foothill/Terrace Stream-Banks
(25.0.373) Valley Stream-Banks
(25.0.374) Coastal-Plain Stream-Banks
(25.0.375) Canyon Stream-Banks

(25.0.380) River Banks
(25.0.381) Montane River-Banks
(25.0.382) Foothill River-Banks
(25.0.383) Valley River-Banks
(25.0.384) Coastal-Plain River-Banks
(25.0.385) Canyon River-Banks

(25.0.390) Margins
(25.0.391) Stream Margins
(25.0.392) River Margins
(25.0.393) Estuary Margins
(25.0.394) Pool Margins
(25.0.395) Pond Margins
(25.0.396) Swale Margins
(25.0.397) Lake Margins
(25.0.398) Seep, Spring Margins
(25.0.399) Meadow, Marsh Margins

(25.0.400.0000) Beds, Bottoms, Bars

(25.0.500.0000) Flats, Plains, Fans, Washes, Bottomlands, Terraces

(25.0.550) Floodplains, Bottomlands
(25.0.551) Stream Floodplains, Bottomlands
(25.0.552) River Floodplains, Bottomlands
(25.0.553) Canyon Floodplains, Bottomlands
(25.0.554) Montane Floodplains, Bottomlands

(25.0.600.0000) Headlands, Bluffs, Slopes

(25.0.610) Headlands

(25.0.620) Cliffs/Bluffs
(25.0.621) Coastal Cliffs/Bluffs
(25.0.622) Canyon Cliffs/Bluffs

(Table IX-1 Continued)

(25.0.630) Slopes
- (25.0.631) Coastal Plain Slopes
- (25.0.632) Canyon Slopes
- (25.0.633) Foothill Slopes
- (25.0.634) Montane Slopes

(25.0.700.0000) Seeps, Springs

(25.0.710) Seeps
- (25.0.711) Drainage Head Seeps
- (25.0.712) Bluff and Slope Seeps
- (25.0.713) Canyon Seeps
- (25.0.714) Stream Bank/Bed Seeps
- (25.0.715) River Bank/Bed Seeps
- (25.0.716) Montane Seeps
- (25.0.717) Footfill Seeps
- (25.0.718) Valley and Plain Seeps
- (25.0.719) Lake Seeps

(25.0.720) Springs
- (25.0.721) Drainage Head Springs
- (25.0.722) Bluff and Slope Springs
- (25.0.723) Canyon Springs
- (25.0.724) Stream Bank/Bed Springs
- (25.0.725) River Bank/Bed Springs
- (25.0.726) Montane Springs
- (25.0.727) Foothill Springs
- (25.0.728) Valley and Plain Springs
- (25.0.729) Lake Springs

(25.0.730) Hot Springs

(25.0.740) Artificial Seeps

(25.0.750) Artificial Springs

(25.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(25.0.830) Meadows
- (25.0.832) Montane Perennial Meadows

(25.0.840) Marshes
- (25.0.842) Perennial Freshwater Marshes

(25.0.850) Swales
- (25.0.851) Montane Drainage Swales
- (25.0.852) Coastal Terrace Drainage Swales
- (25.0.853) Dune Swales
- (25.0.854) Artificial Drainage Swales

(Table IX-1 Continued)

(25.0.900.0000) Artificial Structures

(25.0.910) Stationary Artificial Structures
0.0.912 Bank Revetments
0.0.913 Dams/Levees
0.0.914 Earthen Berms/Dikes
0.0.915 Dredge Spoils

(26.0) SEASONALLY-SATURATED NONTIDAL REGIME

(26.0.100.0000) Water Bodies (Hydrogeomorphic Context)

(26.0.200.0000) Channels, Drainages, Inverts, Falls

0.0.240 Drainage Channels
0.0.241 Vernal Drainage Channels

0.0.250 Inverts
0.0.251 Montane Drainage Inverts

0.0.280 Artificial Ditches

(26.0.300.0000) Beaches, Shores, Banks, Margins

(26.0.370) Stream Banks
(26.0.371) Montane Stream-Banks
(26.0.372) Foothill/Terrace Stream-Banks
(26.0.373) Valley Stream-Banks
(26.0.374) Coastal-Plain Stream-Banks
(26.0.375) Canyon Stream-Banks

(26.0.380) River Banks
(26.0.381) Montane River-Banks
(26.0.382) Foothill River-Banks
(26.0.383) Valley River-Banks
(26.0.384) Coastal-Plain River-Banks
(26.0.385) Canyon River-Banks

(26.0.390) Margins
(26.0.391) Stream Margins
(26.0.392) River Margins
(26.0.393) Estuary Margins
(26.0.394) Pool Margins
(26.0.395) Pond Margins
(26.0.396) Swale Margins
(26.0.397) Lake Margins
(26.0.398) Seep, Spring Margins
(26.0.399) Meadow, Marsh Margins

(Table IX-1 Continued)

(26.0.400.0000) Beds, Bottoms, Bars

(26.0.500.0000) Flats, Plains, Fans, Washes, Bottomlands, Terraces

(26.0.510) Flats
(26.0.511) Vernal Flats

(26.0.520) Plains
(26.0.521) Coastal Plains
(26.0.522) Montane-Valley Vernal Plains
(26.0.523) Alkali Vernal Plains
(26.0.524) Haline Vernal Plains

(26.0.550) Floodplains, Bottomlands
(26.0.551) Stream Floodplains, Bottomlands
(26.0.552) River Floodplains, Bottomlands
(26.0.553) Canyon Floodplains, Bottomlands
(26.0.554) Montane Floodplains, Bottomlands

(26.0.560) Terraces
(26.0.561) River Terraces
(26.0.562) Stream Terraces
(26.0.563) Valley Terraces
(26.0.564) Coastal Terraces

(26.0.600.0000) Headlands, Bluffs, Slopes

(26.0.610) Headlands

(26.0.620) Cliffs/Bluffs
(26.0.621) Coastal Cliffs/Bluffs
(26.0.622) Canyon Cliffs/Bluffs

(26.0.630) Slopes
(26.0.631) Coastal Plain Slopes
(26.0.632) Canyon Slopes
(26.0.633) Foothill Slopes
(26.0.634) Montane Slopes

(26.0.700.0000) Seeps, Springs

(26.0.710) Seeps
(26.0.711) Drainage Head Seeps
(26.0.712) Bluff Seeps
(26.0.713) Canyon Seeps
(26.0.714) Stream Bank/Bed Seeps
(26.0.715) River Bank/Bed Seeps
(26.0.716) Montane Seeps
(26.0.717) Foothill Seeps
(26.0.718) Valley and Plain Seeps

(Table IX-1 Continued)

(26.0.719) Lake-Shore Seeps

(26.0.720) Springs
- (26.0.721) Drainage Head Springs
- (26.0.722) Bluff Springs
- (26.0.723) Canyon Springs
- (26.0.724) Stream Bank/Bed Springs
- (26.0.725) River Bank/Bed Springs
- (26.0.726) Montane Slope Springs
- (26.0.727) Footfill Springs
- (26.0.728) Valley and Plain Springs
- (26.0.729) Lake Springs

(26.0.730) Hot Springs

(26.0.740) Artificial Seeps

(26.0.750) Artificial Springs

(26.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(26.0.830) Meadows
- (26.0.831) Montane Vernal Meadows
- (26.0.832) Montane Perennial Meadows
- (26.0.833) Montane Alkali Meadows

(26.0.840) Marshes
- (26.0.841) Vernal Freshwater Marshes
- (26.0.843) Alkali Marshes
- (26.0.844) Haline Marshes
- (26.0.848) Diked Estuarine Marshes

(26.0.850) Swales
- (26.0.851) Montane Drainage Swales
- (26.0.852) Coastal Terrace Drainage Swales
- (26.0.853) Dune Swales
- (26.0.854) Artificial Drainage Swales

(26.0.900.000) Artificial Structures

(26.0.910) Stationary Artificial Structures
- (26.0.912) Bank Revetments
- (26.0.913) Dams/Levees
- (26.0.914) Earthen Berms/Dikes
- (26.0.915) Dredge Spoils

(Table IX-1 Continued)

(27.0) TEMPORARILY-FLOODED NONTIDAL REGIME

(27.0.100.000) Water Bodies, Hydrogeomorphic Context

(27.0.180) Drainages
(27.0.181) Montane Drainages
(27.0.182) Coastal Canyon Drainages
(27.0.183) Coastal Terrace Drainages

(27.0.200.000) Channels, Drainages, Inverts, Falls

(27.0.240) Drainage Channels
(27.0.251) Vernal Drainage Channels

(27.0.250) Inverts
(27.0.251) Montane Drainage Inverts

(27.0.280) Artificial Ditches

(27.0.300.000) Shores, Beaches, Banks, Margins

(27.0.310) Palustrine Pond Shores
(27.0.311) Dune Pond Shores
(27.0.312) Coastal Pond Shores
(27.0.313) Fault Sag Pond Shores
(27.0.314) Glacial Pond ("Lake") Shores
(27.0.315) Vernal Pond Shores
(27.0.316) Agricultural Pond Shores
(27.0.317) Recreational Pond Shores

(27.0.320) Palustrine Lake/Reservoir Shores
(27.0.321) Vernal Palustrine-Lake Shores
(27.0.322) Agricultural Palustrine-Lake Shores
(27.0.323) Recreational Palustrine-Lake Shores

(27.0.330) Lacustrine Lake/Reservoir Shores
(27.0.331) Montane Freshwater Lacustrine-Lake Shores
(27.0.332) Montane Alkali Lacustrine-Lake Shores
(27.0.333) Playa Lake Shores
(27.0.334) Montane Reservoir Shores
(27.0.335) River Reservoir Shores
(27.0.336) Canyon Reservoir Shores

(27.0.340) Stream Shores
(27.0.341) Montane Stream-Shores
(27.0.342) Foothill/Terrace Stream-Shores
(27.0.343) Valley Stream-Shores
(27.0.344) Coastal-Plain Stream-Shores
(27.0.345) Canyon Stream-Shores

(Table IX-1 Continued)

(27.0.350) River Shores
- (27.0.351) Montane River-Shores
- (27.0.352) Foothill River-Shores
- (27.0.353) Valley River-Shores
- (27.0.354) Coastal-Plain River-Shores
- (27.0.355) Canyon River-Shores

(27.0.360) Beaches
- (27.0.361) River Beaches
- (27.0.362) Lake Beaches

(27.0.370) Stream Banks
- (27.0.371) Montane Stream-Banks
- (27.0.372) Foothill/Terrace Stream-Banks
- (27.0.373) Valley Stream-Banks
- (27.0.374) Coastal-Plain Stream-Banks
- (27.0.375) Canyon Stream-Banks

(27.0.380) River Banks
- (27.0.381) Montane River-Banks
- (27.0.382) Foothill River-Banks
- (27.0.383) Valley River-Banks
- (27.0.384) Coastal-Plain River-Banks
- (27.0.385) Canyon River-Banks

(27.0.390) Margins
- (27.0.391) Stream Margins
- (27.0.392) River Margins
- (27.0.393) Estuary Margins
- (27.0.394) Pool Margins
- (27.0.395) Pond Margins
- (27.0.396) Swale Margins
- (27.0.397) Lake Margins
- (27.0.398) Seep, Spring Margins
- (28.0.399) Meadow, Marsh Margins

(27.0.400.000) Beds, Bottoms, Bars

(27.0.500.000) Flats, Plains, Washes, Bottomlands, Terraces

(27.0.510) Flats
- (27.0.511) Vernal Flats

(27.0.520) Plains
- (27.0.522) Montane-Valley Vernal Plain
- (27.0.523) Alkali Vernal Plains
- (27.0.524) Haline Vernal Plains

(27.0.530) Deltas
- (27.0.531) Stream Deltas

(Table IX-1 Continued)

(27.0.532) River Deltas
(27.0.533) Coastal Deltas
(27.0.534) Lake Deltas

(27.0.540) Washes
(27.0.541) Stream Washes
(27.0.542) River Washes
(27.0.543) Desert Washes

(27.0.550) Floodplains, Bottomlands
(27.0.551) Stream Floodplains, Bottomlands
(27.0.552) River Floodplains, Bottomlands
(27.0.553) Canyon Floodplains, Bottomlands
(27.0.554) Montane Floodplains, Bottomlands

(27.0.560) Terraces
(27.0.561) Stream Terraces
(27.0.562) River Terraces
(27.0.563) Valley Terraces
(27.0.564) Coastal Terraces

(27.0.600.000) Headlands, Bluffs, Slopes, Fans

(27.0.630) Slopes
(27.0.631) Montane Slopes
(27.0.632) Foothill Slopes
(27.0.633) Canyon Slopes
(27.0.634) Coastal Plain Slopes

(27.0.640) Alluvial Fans
(27.0.641) Montane Alluvial Fans
(27.0.642) Foothill Alluvial Fans
(27.0.643) Valley Alluvial Fans

(27.0.700.000) Seeps, Springs

(27.0.800.000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(27.0.900.000) Artificial Structures

(28.0) INTERMITTENTLY-FLOODED NONTIDAL REGIME

(28.0.100.000) Water Bodies, Hydrogeomorphic Context

(28.0.150) Lacustrine Lakes, Reservoirs
(28.0.151) Montane Freshwater Lakes
(28.0.152) Montane Alkali Lakes
(28.0.153) Valley Playa Lakes

(Table IX-1 Continued)

(28.0.160) Streams
- (28.0.161) Montane Streams
- (28.0.162) Foothill/Terrace Streams
- (28.0.163) Valley Streams
- (28.0.164) Coastal-Plain Streams
- (28.0.165) Canyon Streams

(28.0.170) Rivers
- (28.0.171) Montane Rivers
- (28.0.172) Foothill Rivers
- (28.0.173) Valley Rivers
- (28.0.174) Coastal-Plain Rivers
- (28.0.175) Canyon Rivers

(28.0.180) Drainages
- (28.0.181) Montane Drainages
- (28.0.182) Coastal Canyon Drainages

(28.0.200.000) Channels, Drainages, Inverts, Falls

(28.0.210) Stream Channels
- (28.0.211) Montane Stream Channels
- (28.0.212) Foothill/Terrace Stream Channels
- (28.0.213) Valley Stream Channels
- (28.0.214) Coastal-Plain Stream Channels
- (28.0.215) Canyon Stream Channels

(28.0.220) River Channels
- (28.0.221) Montane River Channels
- (28.0.222) Foothill River Channels
- (28.0.223) Valley River Channels
- (28.0.224) Coastal-Plain River Channels
- (28.0.225) Canyon River Channels

(28.0.230) Backbar Channels
- (28.0.231) Stream Backbar Channels
- (28.0.232) River Backbar Channels

(28.0.240) Drainage Channels
- (28.0.241) Vernal Drainage Channels

(28.0.250) Inverts
- (28.0.251) Montane Drainage Inverts

(28.0.260) Falls
- (28.0.261) Montane Stream Falls
- (28.0.262) Foothill Stream Falls
- (28.0.263) Montane River Falls
- (28.0.264) Foothill River Falls

(28.0.280) Artificial Ditches

(Table IX-1 Continued)

(28.0.300.000) Shores, Banks

(28.0.330) Lacustrine Lake/Reservoir Shores
(28.0.331) Montane Freshwater Lacustrine-Lake Shores
(28.0.332) Montane Alkali Lacustrine-Lake Shores
(28.0.333) Playa Lake Shores

(28.0.340) Stream Shores
(28.0.341) Montane Stream-Shores
(28.0.342) Foothill/Terrace Stream-Shores
(28.0.343) Valley Stream-Shores
(28.0.344) Coastal-Plain Stream-Shores
(28.0.345) Canyon Stream-Shores

(28.0.350) River Shores
(28.0.351) Montane River-Shores
(28.0.352) Foothill River-Shores
(28.0.353) Valley River-Shores
(28.0.354) Coastal-Plain River-Shores
(28.0.355) Canyon River-Shores

(28.0.400.0000) Beds, Bottoms, Bars

(28.0.440) Lacustrine Lake/Reservoir Beds/Bottoms
(28.0.441) Montane Freshwater Lake Beds/Bottoms
(28.0.442) Montane Alkali Lake Beds/Bottoms
(28.0.443) Playa Lake Beds/Bottoms

(28.0.450) Stream Beds/Bottoms
(28.0.451) Montane Streambeds
(28.0.452) Foothill/Terrace Streambeds
(28.0.453) Valley Streambeds
(28.0.454) Coastal-Plain Streambeds
(28.0.455) Canyon Streambeds

(28.0.460) River Beds/Bottoms
(28.0.461) Montane Riverbeds
(28.0.462) Foothill Riverbeds
(28.0.463) Valley Riverbeds
(28.0.464) Coastal-Plain Riverbeds
(28.0.465) Canyon Riverbeds

(28.0.470) Stream-Channel Bars
(28.0.471) Montane Stream-Channel Bars
(28.0.472) Foothill/Terrace Stream-Channel Bars
(28.0.473) Valley Stream-Channel Bars
(28.0.474) Coastal-Plain Stream-Channel Bars
(28.0.475) Canyon Stream-Channel Bars

(Table IX-1 Continued)

(28.0.480) River-Channel Bars
(28.0.481) Montane River-Channel Bars
(28.0.482) Foothill River-Channel Bars
(28.0.483) Valley River-Channel Bars
(28.0.484) Coastal-Plain River-Channel Bars
(28.0.485) Canyon River-Channel Bars

(28.0.490) Lake Bars

(28.0.500.000) Flats, Plains, Washes, Bottomlands, Terraces

(28.0.530) Deltas
(28.0.531) Stream Deltas
(28.0.532) River Deltas
(28.0.533) Coastal Deltas
(28.0.534) Lake Deltas

(28.0.540) Washes
(28.0.541) Stream Washes
(28.0.542) River Washes
(28.0.543) Desert Washes

(28.0.550) Floodplains, Bottomlands
(28.0.551) Stream Floodplains, Bottomlands
(28.0.552) River Floodplains, Bottomlands
(28.0.553) Canyon Floodplains, Bottomlands
(28.0.554) Montane Floodplains, Bottomlands

(28.0.600.000) Headlands, Bluffs, Slopes

(28.0.640) Alluvial Fans
(28.0.641) Montane Alluvial Fans
(28.0.642) Foothill Alluvial Fans
(28.0.643) Valley Alluvial Fans

(28.0.700.000) Seeps, Springs

(28.0.710) Seeps
(28.0.711) Drainage Head Seeps
(28.0.712) Bluff Seeps
(28.0.713) Canyon Seeps
(28.0.714) Stream Bank/Bed Seeps
(28.0.715) River Bank/Bed Seeps
(28.0.716) Montane Seeps
(28.0.717) Foothill Seeps
(28.0.718) Valley and Plain Seeps
(28.0.719) Lake-Shore Seeps

(28.0.720) Springs
(28.0.721) Drainage Head Springs

(Table IX-1 Continued)

(28.0.722) Bluff Springs
(28.0.723) Canyon Springs
(28.0.724) Stream Bank/Bed Springs
(28.0.725) River Bank/Bed Springs
(28.0.726) Montane Slope Springs
(28.0.727) Footfill Springs
(28.0.728) Valley and Plain Springs
(28.0.729) Lake Springs

(26.0.730) Hot Springs

(26.0.740) Artificial Seeps

(26.0.750) Artificial Springs

(28.0.800.000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(28.0.840) Marshes
(28.0.845) Stream-Channel Marshes
(28.0.846) River-Channel Marshes
(28.0.847) Lake-Shore Marshes

(28.0.850) Swales
(28.0.851) Montane Drainage Swales
(28.0.852) Coastal Terrace Drainage Swales
(28.0.854) Artificial Drainage Swales

(28.0.900.000) Artificial Structures

(29.0) PHREATOPHYTIC NONTIDAL REGIME

(29.0.100.000) Water Bodies, Hydrogeomorphic Context

(29.0.200.000) Channels, Drainages, Inverts, Falls

(29.0.250) Inverts
(29.0.251) Montane Drainage Inverts

(29.0.300.000) Shores, Beaches, Banks, Margins

(29.0.370) Stream Banks
(29.0.371) Montane Stream-Banks
(29.0.372) Foothill/Terrace Stream-Banks
(29.0.373) Valley Stream-Banks
(29.0.374) Coastal-Plain Stream-Banks
(29.0.375) Canyon Stream-Banks

(Table IX-1 Continued)

(29.0.380) River Banks
- (29.0.381) Montane River-Banks
- (29.0.382) Foothill River-Banks
- (29.0.383) Valley River-Banks
- (29.0.384) Coastal-Plain River-Banks
- (29.0.385) Canyon River-Banks

(29.0.390) Margins
- (29.0.391) Stream Margins
- (29.0.392) River Margins
- (29.0.393) Estuary Margins
- (29.0.394) Pool Margins
- (29.0.395) Pond Margins
- (29.0.396) Swale Margins
- (29.0.397) Lake Margins
- (29.0.398) Seep, Spring Margins
- (29.0.399) Meadow, Marsh Margins

(29.0.400.000) Beds, Bottoms, Bars

(29.0.500.000) Flats, Plains, Washes, Bottomlands, Terraces

(29.0.530) Deltas
- (29.0.531) Stream Deltas
- (29.0.532) River Deltas
- (29.0.533) Coastal Deltas
- (29.0.534) Lake Deltas

(29.0.540) Washes
- (29.0.541) Stream Washes
- (29.0.542) River Washes
- (29.0.543) Desert Washes

(29.0.550) Floodplains, Bottomlands
- (29.0.551) Stream Floodplains, Bottomlands
- (29.0.552) River Floodplains, Bottomlands
- (29.0.553) Canyon Floodplains, Bottomlands
- (29.0.554) Montane Floodplains, Bottomlands

(29.0.560) Terraces
- (29.0.561) Stream Terraces
- (29.0.562) River Terraces
- (29.0.563) Valley Terraces
- (29.0.564) Coastal Terraces

(29.0.600.000) Headlands, Bluffs, Slopes

(29.0.610) Headlands

(29.0.620 Cliffs/Bluffs
- (29.0.621) Coastal Cliffs/Bluffs

(Table IX-1 Continued)

(29.0.622) Canyon Cliffs/Bluffs

(29.0.630) Slopes
(29.0.631) Coastal Plain Slopes
(29.0.632) Canyon Slopes
(29.0.633) Foothill Slopes
(29.0.634) Montane Slopes

(29.0.630) Alluvial Fans
(29.0.631) Montane Alluvial Fans
(29.0.632) Foothill Alluvial Fans
(29.0.633) Valley Alluvial Fans

(29.0.700.000) Seeps, Springs

(29.0.800.000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

(29.0.850) Swales
(29.0.851) Drainage Swales
(29.0.852) Coastal Terrace Drainage Swales
(29.0.853) Dune Swales
(29.0.854) Montane Drainage Swales

(29.0.900.000) Artificial Structures

a narrow band fringing the shoreline. **FIG. IX-14.**

* * * * *

50.000 SYSTEM PALUSTRINE
50.210 CLASS AQUATIC BED

50.214 SUBCLASS ROOTED-VASCULAR

Wetland Type No.: 50.214(21.1.140.5100,6100)
PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (MIXED MONOCOT AND DICOT TYPES) PERMANENTLY-FLOODED POND, "LAKE", AND RESERVOIR WETLANDS. San Luis Obispo Co.: Oso Flaco Lake (dune pond); Pico Creek (canyon mouth pond). Santa Barbara Cp.: Vandenberg Air Force Base (MOD III Pond); Hollister Ranch (agricultural ponds, impounded ponds). Ventura Co.: McGrath Lake (dune pond). Natural and artificial ponds often support dense growths of submerged, rooted aqautic vascular plants representing various genera and families of flower plants. Characteristic species include *Myriophyllum spicatum* spp. *exalbescens, Najas marina, Potamogeton foliosus* spp. *foliosus, P. pectinatus, Ranunculus aquatilus, Ruppia cirrhosa, R. maritima, Zannichellia palustris.* Associated species include attached algae such as *Chara* spp.; rooted aquatic plants such as *Egeria densa* and *Potamogeton crispus*; and floating plants such as *Azolla filiculoids, Hydrocotyle ranunculoides,* and *Lemna* spp. Ecosystem functions include food resources for many species of waterfowl, which disperse the characteristic species along the coast of California and elsewhere. The characteristic species are also an important component of the habitat for aquatic invertebrates and provide food, shelter, and shading for fish. These plants also contribute to water quality by absorbing pollutants and contribute to the reduction of water temperatures through shading. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.214(21.1.726.5161,5161)
PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (*HIPPURIS, RANUNCULUS*) PERMANENTLY-FLOODED MONTANE-SPRING WETLAND. San Bernardino Co.: San Bernardino Mountains, Baldwin Lake Watershed, Shay Meadow. Shay Meadow near Big Bear in the San Bernardino Mountains contains a unique montane valley spring. The perennial spring supports palustrine emergent and aquatic bed wetlands and provides habitat for the endemic and endangered fish, the Shay Meadow Stickleback (*Gasterosteus aculeatus* subsp.). Land use practices in the area threaten the quality of habitat and the surrounding palustrine wetlands that are used for residential development, pasture, and corrals. Characteristic species include *Hippuris vulgaris, Ranunculus aquatilis*, and associated species include *Carex* sp., *Hordeum brachyantherum, Juncus balticus, Mimulus guttatus, Polygonum amphibium, Scirpus acutus.* Aquatic bed species are various algae, *Chara* spp., and associated floating plants such as *Lemna* sp. An important ecosystem function of this wetland is that it serves as habitat for endangered species (e.g., Shay

Meadows Stickleback), as well as for breeding habitat for western toads, and food chain support, hydrology (e.g., perennial fresh water source). **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.214(21.1.141.6152,6154,6161)
PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (*POTAMOGETON, RUPPIA, ZANNICHELLIA*) PERMANENTLY-FLOODED DUNE-POND WETLAND. San Luis Obispo Co., Oso Flaco Lake. Dominants include *Potamogeton pectinatus, Ruppia cirrhosa,* and *Zannichellia palustris.*. Aquatic-Bed Floating-Alga dominant is *Enteromorpha* sp. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland within a narrow band fringing the shoreline. **FIG. IX-13.**

Wetland Type No.: 50.214(21.1.147.5121,5142,6152,6161)
PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (*CERATOPHYLLUM, MYRIOPHYLLUM, POTAMOGETON, ZANNICHELLIA*) PERMANENTLY-FLOODED AGRICULTURAL-POND WETLAND. Santa Barbara Co., Vandenberg Air Force Base, MOD III Pond. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland within a narrow band fringing the shoreline. **FIG. IX-14.**

Wetland Type No.: 50.215(21.1.130,140,850.4311,6140)
PALUSTRINE AQUATIC-BED AQUATIC-BED FLOATING-VASCULAR (*AZOLLA*, LEMNACEAE) PERMANENTLY-FLOODED SPRING, POND, AND SWALE WETLAND. San Bernardino Co.: San Bernardino National Forest (springs). Santa Barbara Co.: La Purissima Mission State Historic Park (historic Reservoirs); Vandenberg Air Force Base (ponds, dune swales); Hollister Ranch (agricultural ponds). Floating aquatic bed plants are common in many wetland habitats that are characterized by various water regimes. Duckweed (*Lemna*) and Duckweed Fern (*Azolla*) are the most common genera. Some habitats, especially those with nutrient enrichment, can support a cover of 100% floating species. Many species of floating vascular plants also occur in wetlands dominated by emergent vascular plants. Characteristic species include floating vascular species (*Azolla filiculoides, Lemna gibba, L. minuscula, L. minor, L. trisulca, L. valdiviana, Spirodella polyrrhiza, S. punctata, Wolffiella ligulata, W. columbiana, W.* spp. Associated floating and emergent vascular plants include *Hydrocotyle ranunculoides* and *Rorripa nasturtium-aquaticum*. This wetland type functions in food chain support as food for water fowl and in maintaining water quality.

* * * * *

50.000 SYSTEM PALUSTRINE
50.240 CLASS EMERGENT WETLAND

50.241 SUBCLASS EMERGENT-PERSISTENT WETLAND

Wetland Type No.: 50.241(21-23.1.143.6251)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS*) PERMANENTLY- TO SEMIPERMANENTLY-FLOODED FAULT-SAG-POND WETLAND. Riverside Co., Temescal Wash. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as jurisdictional wetland within a narrow band fringing the shoreline. **FIG. IX-17.**

Wetland Type No.: 50.241(21,23.1.214.6251,6621,6632)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS, SPARGANIUM, TYPHA*) PERMANENTLY- TO SEMIPERMANENTLY-FLOODED COASTAL-PLAIN STREAM-CHANNEL WETLAND. Santa Barbara Co., Vandenberg Air Force Base, San Antonio Creek. Dominant emergent species are *Scirpus acutus, Sparganium eurycarpum,* and *Typha domingensis*. The adjacent forested wetland is dominated by *Salix lasiolepis*. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as jurisdictional wetland within a narrow band fringing the shoreline. **FIG. IX-18.**

Wetland Type No.: 50.241(21,25.2.563.4322,5325,6223,6255)
PALUSTRINE EMERGENT-PERSISTENT (*ATHYRIUM, STACHYS, CAREX, SCIRPUS*) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON- FLOODPLAIN WETLAND. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. As shown here, dominants include *Athyrium filix-femina, Stachys chamissonis, Carex nutkatensis*, and *Scirpus microcarpus*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-20.**

Wetland Type No.: 50.241(21,25.2.563.6255,6633)
PALUSTRINE EMERGENT-PERSISTENT (*RORRIPA, SCIRPUS, TYPHA*) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. The unusual, permanently wet, organic soils of the habitat support many rare and endangered species such as *Rorripa gambelii*, a broadleaved herbaceous species visible among *S. microcarpus*, in addition to other species that reach their southern limits of distribution in wetlands in Black Lake Canyon. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-19.**

Wetland Type No.: 50.241(21,25.2.563.7000)
PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Black Lake Canyon. Wetlands in unique canyon-bottoms in coastal central California are characterized by seasonally-flooded and permanently or semipermanently saturated hydrology. Various classes of palustrine wetlands occur in this HGM unit including a type of emergent wetland that supports many sensitive plant species. The wet, organic soils characterize a form of "bog-like" freshwater marsh where many northern plant species (e.g., *Carex cusickii, Calamagrostis nutkaensis*) reach their southern limits of distribution. Characteristic

herbaceous species include *Arenaria paludicola, Athrium felix-femina, Carex cusickii, Cladium californicum, Calamagrostic nutkaensis, Galium trifidum, Platanthera leucostachys, Psoralea orbiculata, Rumex fenestratus, Rorripa gambelii, Scirpus microcarpus, S. americanus, Solidago confinus, Sparganium eurycarpum, Stachys chamissonis, Typha latifolia,* and *Urtica dioica.* Associated shrub species include *Baccharis douglasii, Lonicera involucrata,* and *Ribes divaricatum.* Associated trees include *Myrica californica* and *Salix lasiolepis.* Significant ecosytem functions include habitat for endangered species (i.e., *Arenaria paludicola, Rorripa gambelii*, and the Pacific Pond Turtle. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(21.3.728.6252,6632)
PALUSTRINE PERSISTENT-EMERGENT (*SCIRPUS AMERICANUS, TYPHA DOMINGENSIS*) PERMANENTLY-FLOODED ALKALI VALLEY-SPRING WETLAND. San Luis Obispo Co., Cuyama Valley. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-23.**

Wetland Type No.: 50.241(21.3.728.6252,6632)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS AMERICANUS, TYPHA DOMINGENSIS*) PERMANENTLY-FLOODED ALKALI VALLEY-SPRING WETLAND. San Luis Obispo Co., Cuyama Valley. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-22.**

Wetland Type No.: 50.241(23.1.241.6241,6322)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS, JUNCUS OXYMERIS*) SEMIPERMANENTLY-FLOODED MONTANE-DRAINAGE-CHANNEL WETLAND. San Diego Co., Rancho Cuyamacha State Park, vicinity of Cuyamacha Lake. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(23.1.849.6253,6632)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS CALIFORNICUS, TYPHA DOMINGENSIS*) SEMIPERMANENTLY-FLOODED LAGOON-SHORE WETLAND. San Diego Co., Oceanside, Buena Vista Lagoon. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(24.1.374.6255)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS MICROCARPUS*) SEASONALLY-FLOODED COASTAL-PLAIN STREAM-BANK WETLAND. San Luis Obispo Co., Morro Bay, Morro Creek. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as jurisdictional wetland within a narrow band fringing the shoreline. **FIG. IX-21.**

Wetland Type No.: 50.241(24.1.145.6242)
PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA*) SEASONALLY-FLOODED VERNAL-POND WETLAND. Santa Barbara Co., foothill-valley of the San Rafael Mountains, Sedgwick Ranch. Persistent emergent

vegetation dominated by *Eleocharis palustris* characterizes the margins of the pond and adjacent vernal marsh wetland. Nonpersistent emergent vegetation can colonize the outer margins or the center of the pond in drier years, forming habitat with characteristics of vernal pools. **Section 404 Jurisdiction:** These named wetlands are jurisdictional wetlands probably to the outlet elevation of the pond. **FIG. IX-16.**

Wetland Type No.: 50.241(24.1.811.1100)
PALUSTRINE PERSISTENT-EMERGENT SEASONALLY-FLOODED VERNAL-POOL WETLAND. Santa Barbara Co., Goleta, Ellwood Mesa. Depending on the time of year, flooding state of the water regime, and dominant type of substrate or organisms, such vernal pools may be classified as several wetland types, including unconsolidated-bottom, aquatic bed, emergent-persistent, and emergent-nonpersistent wetlands. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-29.**

Wetland Type No.: 50.241(24.1.811.5224,6241,6242)
PALUSTRINE PERSISTENT-EMERGENT (*ERYNGIUM VASEYI, ELEOCHARIS* SPP.) SEASONALLY-FLOODED COASTAL-MESA VERNAL-POOL WETLAND. Santa Barbara Co., Goleta, Ellwood Mesa. Although many vernal pools support nonpersistent emergent vegetation, those of the Santa Barbara area are generally characterized by persistent vegetation that is dominated by *Eryngium vasey, Eleocharis acicularis,* and *Eleocharis macrostachya*. Numerous species characteristic of nonpersistent vegetation also occur in these pools, including the annual plants *Callitriche marginata, Crassula aquatica, Elatine brachysperma,* and *Psilocarphus brevissimus*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG.IX-29, IX-30.**

Wetland Type No.: 50.241(24.1.816.7000)
PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) PLATEAU-VERNAL-POOL WETLAND. Riverside Co., Santa Rosa Plateau. Dominant species include *Descahmpsia danthonioides, Blennosperma nanum, Alopecurus saccatus, Psilocarphus brevissimus, Plantago elongata, Callichtriche marginata, Veronica peregrina, Lasthenia californica, Lilaea scilloides, Plagiobothrys undulatus, Eryngium aristulatum, Elatine brachysperma, Crassula aquatica, Eleocharis acicularis*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(24.1.826.6242,6612)
PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA, PASPALUM DISTICHUM*) SEASONALLY-FLOODED VERNAL-LAKE WETLAND. Riverside Co., Santa Rosa Plateau, Mesa de Colorado. Vernal wetlands of the Plateau vary in size and function from vernal pools to vernal lakes and from vernal marshes to tenajas. The extensive variation and gradation among types contributes to the species richness of the plateau. Dominance types can vary depending on the time of year, and the depth and duration of flooding. Margins of vernal lakes and pools may be dominated by *Blennosperma nanum*, whereas *Lilaea scilloides* may dominate bottoms of depressions that flood longer. As sites desiccate, dominance types also may change, whereby species

characteristic of flooded conditions are replaced by species that colonize exposed soils. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-24, IX-25.**

Wetland Type No.: 50.241(24.1.826.5566,6111,6240)
PALUSTRINE EMERGENT-PERSISTENT (*AMMANNIA, ALISMA, ELEOCHARIS*) SEASONALLY-FLOODED VERNAL-LAKE WETLAND. Santa Barbara Co., Laguna Blanca (now seriously degraded) and historically the "lagunitas" in the Carpinteria Valley; Ventura Co., Mirror Lake in the Ojai Valley; Orange Co., Upper Laguna Lake in Laguna Canyon. Characteristic species include *Alisma plantago-aquatica, Ammannia coccinea, Bergia texana, Crassula aquatica, Cyperus aristatus, Eleocharis acicularis, E. macrostachya, Hydrocotyle ranunculoides, Limosella acaulis, Lindernia dubia* var. *anagallidea, Marsillea vestita, Pilularia americana, Sagittaria sanfordii,* and *Xanthium strumarium*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(24.1.831.5261,6210,6320,6594)
PALUSTRINE EMERGENT-PERSISTENT (*SOLIDAGO, CAREX, JUNCUS, MUHLENBERGIA*) SEASONALLY-FLOODED MONTANE-VERNAL-MEADOW WETLAND. San Diego Co., Cleveland National Forest, Laguna Mountains, Laguna Fire Station. These montane meadows are rich in plant species and are dominated or characterized by *Solidago californica, Carex* spp., *Juncus balticus, J. tenuis,* and *Muhlenbergia rigens.* Other characteristic genera include *Artemisia, Aster, Gnaphalium, Mimulus,* and *Sidalcea.* **Section 404 Jurisdiction:** This named wetland possibly is not a jurisdictional wetland because of the lack of adequate hydrology and possibly hydric soils. **FIG. IX-26.**

Wetland Type No.: 50.241(24.1.851.6317)
PALUSTRINE PERSISTENT-EMERGENT (*JUNCUS MEXICANUS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND. San Diego Co., Cleveland National Forest, Laguna Mountains, Meadows Information Station. **Section 404 Jurisdiction:** This named wetland possibly is not a jurisdictional wetland because of the lack of adequate hydrology and possibly hydric soils. **FIG. IX-27.**

Wetland Type No.: 50.241(24.1.851.6325)
PALUSTRINE EMERGENT-PERSISTENT (*JUNCUS RUGULOSUS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND. Riverside Co., Santa Ana Mountains, DeLuz Creek Watershed, DeLuz Rd. and Via Vaquera. This wetland can also be classified as a form of vernal-marsh that is characterized by other monocot hydrophytes such as *Eleocharis macrostachya, Juncus mexicanus,* and *Leymus triticoides.* **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-28.**

Wetland Type No.: 50.241(24,25.1.832.7000)
PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED AND PERMANENTLY SATURATED MONTANE-PERENNIAL-MEADOW WETLAND. San Bernardino Co., San Bernardino Mountains, san Gorgonio Wilderness

Area, South Fork of the Santa Ana River. Permanently saturated meadows along the South Fork have perhaps the richest flora of the study region. This wetland type occurs in a *Abies concolor* (White Fir) and *Pinus jeffreyi* (Jeffrey Pine) forest setting. Plant genera represented include, for example, grasses (*Elymus, Poa, Glyceria*), rushes (*Juncus, Luzula*), sedges (*Carex, Eleocharis*), and many forbs (*Angelica, Aster, Berula, Dephinium, Barbarea, Dodecatheon, Heracleum, Geranium, Helenium, Hypericum, Epilobium, Gayophytum, Gentiana, Lilium, Lupinus, Lotus, Senecio, Stachys, Veratrum, Smilacina, Sidalcea, Solidago*, and others). **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(24,26.1.832.7000)
PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED MONTANE-VERNAL-MEADOW WETLAND. San Bernardino Co., San Bernardino Mountains, San Bernardino National Forest, meadow at Champion Lodgepole Pine. "Dry" (seasonally saturated) meadows occur in the San Bernardino Mountains in openings in forests dominated by *Abies concolor, Pinus contorta*, and *Pinus jeffrey*. They are characterized by mineral rather than organic soils and are rich in plant species, although generally dominated by sedges, rushes, and grasses. Meadows in this mountain range vary considerably depending on the depth and duration of flooding and whether they remain saturated during the dry summers or dessicate. Characteristic species include *Achillea millifolium, Agrostis* sp., *Aquilegia frondosa, Carex praegracilis, Carex* spp., *Castilleja* spp., *Danthonia californica* var. *americana, Elymus glaucus, Glyceria* sp., *Juncus balticus, Juncus* sp., *Potentilla glandulosa, Pteridium aquilinum, Smilacina racemosa*. **Section 404 Jurisdiction:** This named wetland probably would not be regulated as a jurisdictional wetland.

Wetland Type No.: 50.241(24,26.1.8312.7000)
PALUSTRINE EMERGENT-PERSISTENT (*JUNCUS PHAEOCEPHALUS*) SEASONALLY- FLOODED VERNAL-DRAINAGE-SWALE WETLAND. San Luis Obispo Co., Piedras Blancas and San Simeon State Beach. **Section 404 Jurisdiction:** This named wetland may be regulated as a jurisdictional wetland, depending on adequate hydrology and the presence of hydric soils.

Wetland Type No.: 50.241(24,28.3.152.6251)
PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS*) SEASONALLY TO INTERMITTANTLY- FLOODED MONTANE-ALKALI LAKE-WETLAND. San Bernardino Co., Baldwin Lake. Baldwin Lake in the San Bernardino National Forest is a naturally, seasonally-flooded, alkali lake that occurs on the eastern-most edge of the coastward draining watersheds of the San Bernardino Mountains. It is situated, however, in a basin without external drainage. Although it does not flood every year, the lake shore and bed supports palustrine persisten-emergent vegetation of several dominance types in addition to lacustrine wetlands such those that develop along wave-formed shorelines. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.1.712,714.5453)
PALUSTRINE PERSISTENT-EMERGENT (*NICOTIANA QUADRIVIALIS*) SEASONALLY-SATURATED SLOPE AND STREAM-BANK-SEEP WETLAND. San Luis Obispo Co., Cuyama Valley, Cottonwood Creek. This unique wetland occurs in a grassland setting as a seep mud-flow disturbance site, which is dominated by a dense stand of the native annual *Nicotiana quadrivialis* (Indian Tall Tobacco). *Heliotropium curassavicum* is an associated species. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.1.716.6242,6325)
PALUSTRINE PERSISTENT-EMERGENT (*ELOECHARIS MACROSTACHYA, JUNCUS RUGULOSUS*) SEASONALLY-SATURATED PLATEAU-SEEP WETLAND. Riverside Co., Santa Rosa Plateau, Slaughterhouse Canyon area, Clinton-Keith Road. Characteristic species include *Sidalcea* sp., *Lythrum* sp., *Juncus bufonius, Astragalus, Cerastium* sp., *Erodium* sp., and *Bromus hordeaceus*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.1.851.6222, 6242, 6325, 6325, 6594)
PALUSTRINE EMERGENT-PERSISTENT (*CAREX PRAEGRACILIS, ELEOCHARIS MACROSTACHYA, JUNCUS RUGULOSUS, MUHLENBERGIA RIGENS*) SEASONALLY- FLOODED MONTANE-DRAINAGE-SWALE WETLAND. Riverside Co., Santa Rosa Plateau, Slaughterhouse Canyon Area, Clinton-Keith Rd. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.1.853.6311,6317)
PALUSTRINE EMERGENT-PERSISTENT SEASONALLY- SATURATED BEACH-SWALE WETLAND. San Diego Co., Encinitas, South Carlsbad State Beach, Batiquitos Lagoon. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.3.398.5252,5256,6481,6652)
PALUSTRINE EMERGENT-PERSISTENT (*ARTEMISIA, GUTIERREZIA, DISTICHLIS, POA*) SEASONALLY-SATURATED ALKALI SPRING- MARGIN WETLAND. San Bernardino Co., San Barnardino Mountains, Baldwin Lake Ecological Reserve. The mixed-vascular dominance types and endemic flora contribute to the species richness. Dominant or characterisitc species can include *Artemisia ludoviciana, Gutierrezia sarothrae, Distichlis spicata,* and *Poa secunda.* Endemic and rare or endangered species include *Castilleja cinerea, Ivesia argyrocoma, Sidalcea pedata,* and *Thelypodium stenopetalum.* **Section 404 Jurisdiction:** This named wetland possibly is not a jurisdictional wetland because of the lack of adequate hydrology and possibly hydric soils. **FIG.IX-31.**

Wetland Type No.: 50.241(26.3.831.5252,5265,6481,6652)
PALUSTRINE EMERGENT-PERSISTENT (*ARTEMISIA, GUTIERREZIA, DISTICHLIS, POA*) SEASONALLY-SATURATED ALKALI MONTANE-MEADOW WETLAND. San Bernardino Co., San Bernardino Mountains, Big Bear Lake, Eagle Point.

Although the habitat is different than the spring-margin alkali type, this alkali meadow supports the same type of wetland dominants and the endemic, endangered flora restricted to the old deltaic sediments, which were deposited in Pleistocene lakes that once characterized the region. **Section 404 Jurisdiction:** This named wetland possibly is not a jurisdictional wetland because of the lack of adequate hydrology and possibly hydric soils. **FIG. IX-32.**

Wetland Type No.: 50.241(26.3.398.5291,6481,6582)
PALUSTRINE EMERGENT-PERSISTENT (*FRANKENIA, DISTICHLIS, LEYMUS*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND. San Luis Obispo Co., Cuyama Valley. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-22.**

Wetland Type No.: 50.241(26.6.551.5272,5291,5552, 6481)
PALUSTRINE EMERGENT-PERSISTENT (*SALICORNIA, FRANKENIA, ATRIPLEX, DISTICHLIS*) SEASONALLY-SATURATED EURYHALINE STREAM-FLOODPLAIN WETLAND. San Diego Co., San Elijo State Ecological Preserve. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.6.848.5272,5291)
PALUSTRINE EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA, FRANKENIA, SALINA*) SEASONALLY-SATURATED EURYHALINE DIKED-ESTUARINE-MARSH WETLAND. San Diego Co., San Elijo State Ecological Preserve. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(26.6.849.5259,6256,6311,6481)
PALUSTRINE EMERGENT-PERSISTENT (*JAUMEA CARNOSA, SCIRPUS PUNGENS, JUNCUS ACUTUS, DISTICHLIS SPICATA*) SEASONALLY-SATURATED EURYHALINE LAGOON-SHORE-MARSH WETLAND. San Diego Co., Oceanside, Buena Vista Lagoon. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(27.1.833.7000)
PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) TEMPORARILY-FLOODED BEACH-SWALE WETLAND. San Diego Co., Encinitas, South Carlsbad State Beach, Batiquitos Lagoon in barrow pit. Dominant species include *Xanthium strumarium, Cyperus eragrostis, Paspalum dilatatum, Conyza canadensis, Lythrum hyssopifolia, Chenopodium ambrosioides, Gnaphalium luteo-album*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.241(28.1.551.6222,6317,6582)
PALUSTRINE EMERGENT-PERSISTENT (*CAREX PRAEGRACILIS, JUNCUS MEXICANUS, LEYMUS TRITICOIDES*) INTERMITTANTLY-FLOODED STREAM-FLOODPLAIN WETLAND. Riverside Co., Santa Rosa Plateau. **Section 404 Jurisdiction:** This named wetland possibly is not a jurisdictional wetland because of the

lack of adequate hydrology and possibly hydric soils.

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50.000 SYSTEM PALUSTRINE
50.240 CLASS EMERGENT WETLAND

50.242 SUBCLASS EMERGENT-NONPERSISTENT WETLAND

Wetland Type No.: 50.242(24.1.112.1500,5595)
PALUSTRINE EMERGENT-NONPERSISTENT (MIXED-COARSE AND *MIMULUS GUTTATUS*) SEASONALLY-FLOODED TENAJA WETLAND. Riverside Co., Ranta Rosa Plateau, Volcano Rd. at Rancho California Rd. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as an adjacent wetland. **FIG. IX-33.**

Wetland Type No.: 50.242(24.1.812.1500,1600,5547)
PALUSTRINE EMERGENT-NONPERSISTENT (*DOWNINGIA CUSPIDATA*, MIXED-COARSE, SAND TYPES) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Kearny Mesa, Miramar Mounds National Natural Monument. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-37.**

Wetland Type No.: 50.242(24.1.812.5547)
PALUSTRINE EMERGENT-NONPERSISTENT (*DOWNINGIA CUSPIDATA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Kearny Mesa, Miramar Mounds National Natural Monument. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-36.**

Wetland Type Nos.: 50.242(24.1.812.5532)
PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Otay Mesa, Upper O'Neil Canyon. This driest phase of the Otay vernal pools is characterized by upland and wetland annual species and is dominated by *Lasthenia californica*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-34.**

Wetland Type No. 50.242(24.1.812.5532)
PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Otay Mesa, Upper O'Neil Canyon. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-35.**

Wetland Type No. 50.242(24.1.826.7000)
PALUSTRINE EMERGENT-NONPERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED VERNAL-LAKE WETLAND. Riverside Co., Santa Rosa Plateau. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No. 50.242(24,26.6.511,524,7000)
PALUSTRINE EMERGENT-NONPERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED OR SATURATED EURYHALINE VERNAL-FLAT OR PLAIN WETLAND. Santa Barbara Co., Santa Barbara Municipal Airport at Goleta Slough; Ventura Co., Pt. Mugu Pacific Missile Testing Center at Mugu Lagoon; San Diego Co., San Dieguito Lagoon. Coastal streams that flow into saline or hypersaline estuarine environments generally produce deltas that are characterized by seasonally-saturated nontidal palustrine wetlands as well as irregularly-flooded intertidal estuarine wetlands. The palustrine wetlands are generally seriously degraded by urbanization and often are separated from the deltaic continuum by berms, ditches, roads, runways, and other artificial structures. The palustrine habitats dominated by annual plants are classified as Palustrine Nonpersistent Emergent Wetlands, whereas those dominated by perennials or shrubs are classified as Palustrine Persistent Emergent or Scrub-Shrub Wetlands. Characteristic species include *Atriplex argentea* var. *mohavensis, A. triangularis, Hordeum depressum, Hutchinsia procumbens, Juncus bufonius, Lasthenia glabrata* ssp. *coulteri, Salicornia europaea, Spergularia marina,* and *Suaeda calceoliformis.*

Wetland Type No. 50.242(24,26.1.522,7000)
PALUSTRINE EMERGENT-NONPERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED MONTANE-VERNAL-PLAIN WETLAND. Ventura Co., Upper Ojai Valley; Riverside Co., Murrietta Valley. These unique vernal plains have been heavily impacted by agriculture and grazing, and today support mostly naturalized (and native) weedy species. These include *Anthemis cotula, Juncus bufonius, Lythrum hyssopifolia, Lolium multiflorum, Polypogon monspeliensis.*

Wetland Type No. 50.242(24,26.1.854.6721)
PALUSTRINE EMERGENT-NONPERSISTENT (*LOLIUM MULTIFLORUM*) SEASONALLY-SATURATED VERNAL-DRAINAGE-SWALE WETLAND. Santa Barbara Co., Dos Pueblos Rancho. Coastal drainage swales of the region generally occur in grassland settings and serve as rangeland for cattle. The dominant annual grass in this wetland swale is *Lolium multiflorum.*

Wetland Type No.: 50.242(26.3.523.5532)
PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED ALKALI VERNAL-PLAIN WETLAND. Riverside Co., Old Salt Creek Drainage west of Hemet, Florida Ave. and Warren Rd. Small basins forming vernal pools with different dominance types occur throughout the plain. The disked, desiccated plain is dominated by *Lasthenia californica,* but may appear with different dominant plant species depending on the time of year, amount of rainfall in a particular year, proximity to local vernal pool areas, and degree of disturbance. **Section 404**

Jurisdiction: This named wetland is a jurisdictional wetland. **FIG. IX-39.**

Wetland Type No.: 50.242(26.6.848.5558)
PALUSTRINE EMERGENT-NONPERSISTENT (*SALICORNIA EUROPEA*) SEASONALLY-SATURATED EURYHALINE DIKED-ESTUARINE-MARSH WETLAND. San Diego Co., San Elijo State Ecological Reserve. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.242(28.1.551.6222,6317.6582)
PALUSTRINE EMERGENT-PERSISTENT (*CAREX PRAEGRACILIS, JUNCUS MEXICANUS, LEYMUS TRITICOIDES*) INTERMITTENTLY-FLOODED STREAM-FLOODPLAIN WETLAND. Riverside Co., Santa Rosa Plateau. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland.

Wetland Type No.: 50.242(28.3.333.5533)
PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA GLABRATA*) INTERMITTENTLY-FLOODED ALKALI PLAYA-LAKE-SHORE WETLAND. Riverside Co., San Jacinto Valley, San Jacinto Wildlife Area, vicinity of Mystic Lake. Fragmentation of wetlands of the region has converted some lacustrine wetlands into palustrine types. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-38.**

* * * * *

50.000 SYSTEM PALUSTRINE
50.250 CLASS SCRUB-SHRUB WETLAND

50.251 SUBCLASS B R O A D L E A V E D - D E C I D U O U S

Wetland Type No.: 50.251(23.1.155.5765,5766)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA, SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED RIVER-VALLEY-RESERVOIR WETLAND. San Luis Obispo Co., Twitchell Reservoir on the Cuyama River at Alamo Creek. The willow scrub formed on alluvial deposits in the reservoir during low-water conditions. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as a mosaic of jurisdictional wetlands within the high water mark. **FIG. IX-40.**

Wetland Type No.: 50.251(23.1.155.5765,5766)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA, SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED VALLEY-RIVER-RESERVOIR WETLAND. San Luis Obispo Co., Twitchell Reservoir

on the Cuymama River at Alamo Creek. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as a mosaic of jurisdictional wetlands within the high water mark. **FIG. IX-41.**

Wetland Type No.: 50.251(24.1.482.5769)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX SCOULERIANA*) SEASONALLY-FLOODED FOOTHILL-RIVER CHANNEL-BAR WETLAND. Monterey Co., Pfieffer Big Sur State Park, Big Sur River. Scrub-shrub wetland dominated by *Salix scouleriana* (left center) occurs on a channel-bar adjacent to riverine unconsolidated-bottom wetland. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland within a very narrow band fringing the channel. **FIG. IX-42.**

Wetland Type No.: 50.251(24,25.1.716,726,824,??5968)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LUTEA*) SEASONALLY-FLOODED AND PERMANENTLY-SATURATED MONTANE-SPRING, SEEP AND GLACIAL POND WETLANDS. San Bernardino Co., San Gorgonio Wilderness Area, Dollar Lake. Scattered patches of willow-dominated scrub-shrub wetland occur at many wetland habitats in the Transverse Ranges. *Salix lutea* is common at high elevations in the study region. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland within a very narrow band fringing the channel.

Wetland Type No.: 50.251(24,25.1.375,716,726,5791)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*VITIS GIRDIANA*) PERMANENTLY AND SEASONALLY-SATURATED CANYON-STREAM-BANK, MONTANE-SEEP AND MONTANE-SPRING WETLANDS. San Bernardino Co., San Bernardino Mountains, City Canyon, along Rt. 330. Scattered dense tangles of this native grape dominate seeps and springs along rocky banks at ledges of montane canyons, such as along Rt. 330.

Wetland Type No.: 50.251(25.1.375,715,5756)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*RUBUS PARVIFLORUS*) PERMANENTLY-SATURATED RIVER-BANK-SEEP WETLAND. Monterey Co., Banks of the Big Sur River, Pfeiffer Big Sur State Park, Santa Lucia Mountains. In the central coastal portion of California, e.g., in the Santa Lucia Mountains, perennial seeps and springs generally support a rich association of hydrophytic shrubs and herbaceous plants. When shrubs dominate these conditions, *Rubus parviflorus* is frequently the shrub that characterizes the vegetion of this hydrogeomorphic unit.

Wetland Type No.: 50.251(26.1.851.5752)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*ROSA CALIFORNICA*) SEASONALLY-SATURATED MONTANE-DRAINAGE-SWALE WETLAND. San Diego Co., Laguna Mountains, Cleveland National Forest, Meadows Information Station. This wetland occurs on the edges of swales characterized by palustrine emergent wetland and dominated by rushes such as *Juncus mexicanus* See

FIG. IX-27.

* * * * *

50.000 SYSTEM PALUSTRINE
50.250 CLASS SCRUB-SHRUB WETLAND

50.253 SUBCLASS B R O A D L E A V E D - E V E R G R E E N

Wetland Type No.: 50.253(24.1.453.5623)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*BACCHARIS SALICIFOLIA*) SEASONALLY-FLOODED VALLEY-STREAMBED WETLAND. San Diego Co., Cottonwood Creek, Rt. S-1 northwest of Lake Morena. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. XI-43.**

Wetland Type No.: 50.253(24.1.453.5781)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*TAMARIX RAMOSISSIMA*) SEASONALLY-FLOODED VALLEY-STREAMBED WETLAND. San Diego Co., Cottonwood Creek, Rt. S-1 northwest of Lake Morena. This wetland is dominated by the invasive-exotic shrub *Tamarix ramosissima*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. XI-44.**

Wetland Type No.: 50.253(26.3.398.5643)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*SUAEDA MOQUINII*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND. San Luis Obispo Co., Cuyama River Valley, Highway 166, east of Highway 33. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-45.**

Wetland Type No.: 50.253(26.3.398.5643)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*SUAEDA MOQUINII*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND. San Luis Obispo Co., Cuyama River Valley, Highway 166, east of Highway 33. Palustrine emergent wetland (upper center) is adjacent to the scrub-shrub wetland. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-46.**

Wetland Type No.: 50.253(26,29.1.853.5622)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*BACCHARIS PILULARIS*) SEASONALLY-SATURATED OR PHREATOPHYTIC DUNE-SWALE WETLAND. Santa Barbara Co.San Antonio Terrace, Vandenberg Air Force Base. Dune swale wetlands in coastal dune systems are characterized by various types of wetland that largely reflect the water regime of the site. The outer zone of seasonally flooded swales and the bottom zone of the driest wetland swales are often dominated by phreatophytic shrubs, especially *Baccharis pilularis*, and usually have emergent hydrophytes, such as *Carex praegracilis*, as a dominant understory. **Section 404 Jurisdiction:** This named

wetland probably is not regulated as a jurisdictional wetland.

Wetland Type No.: 50.253(26,29.3.554,641.5628)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*CHRYSOTHAMNUS NAUSEOSUS*) SEASONALLY-SATURATED OR PHREATOPHYTIC MONTANE FLOODPLAIN AND ALLUVIAL FAN WETLAND. San Bernardino Co., San Bernardino Mountains National Forest, Fawnskin, Highway 38, Baldwin Lake. In the vicinity of Big Bear and Baldwin Lakes in the San Bernardino Mountains, exposed Pleistocene deltas and Holocene floodplains, alluvial fans, and washes support scrub-shrub wetlands that are seasonally saturated or more characteristically phreatophytic and dominated by *Chrysothamnus nauseosus*. This form of alkali scrub is often in the vicinity of seasonal seeps and springs and alkali emergent wetlands in the form of vernal meadows and vernal marshes. It occurs in the contest of Jeffrey Pine and White Fir Forest. **Section 404 Jurisdiction:** This named wetland probably is not regulated as a jurisdictional wetland.

Wetland Type No.: 50.253(27.1.385.5627)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*PLUCHEA SERICEA*) TEMPORARILY-FLOODED CANYON-RIVER-BANK WETLAND. San Luis Obispo Co., Cuyama River Gorge. *Pluchea*-dominated scrub-shrub wetland occurs on a narrow, undercut bank. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark. The *Pluchea*-dominated wetland is not jurisdictional because of inadequate hydrology. **FIG. IX-47.**

Wetland Type No.: 50.253(28.1.561.5627)
PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*PLUCHEA SERICEA*) PHREATOPHYTIC RIVER-TERRACE WETLAND. San Luis Obispo Co., Cuyama River Valley. *Pluchea sericea* forms an extensive scrub-shrub wetland on alluvial soils deposited in the lower valley, up-river from the Cuyama River Gorge. **Section 404 Jurisdiction:** This named wetland is not a jurisdictional wetland because of inadequate hydrology and a lack of hydric soils. **FIG. XI-48.**

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50.000 SYSTEM PALUSTRINE
50.250 CLASS SCRUB-SHRUB WETLAND

50.257 SUBCLASS MIXED DECIDUOUS AND EVERGREEN

Wetland Type No.: 50.257(24,28.1.480.5623,5624,5625,5626,5721)
PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (*BACCHARIS, BRICKELLIA, ISOCOMA, LEPIDOSPARTUM, ERIOGONUM*) TEMPORARILY OR INTERMITTANTLY-FLOODED RIVER-CHANNEL-BAR

WETLAND. Monterey Co., Big Sur River, Andrew Molera State Park; Santa Barbara Co., Santa Ynez and Santa Maria Rivers; Ventura Co., Santa Clara and Ventura Rivers; San Diego Co., San Luis Rey River. Wetland occurs on bars in channels of intermittent and perennial streams and rivers throughout the study region. Characteristic species include *Baccharis salicifolia, Brickellia californica, Eriogonum fasciculatis, Isocoma veneta, Lepidospartum squamatum, Salix exigua, S. lasiolepis* (scrub), *Solanum douglasii.*

Wetland Type No.: 50.257(26,29.1.379,553.5614,5622,5755,5626,5661)
PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (*TOXICODENDRON, BACCHARIS, RUBUS, RIBES*) SEASONALLY-SATURATED TO PHREATOPHYTIC CANYON-STREAM-BANK AND BOTTOMLAND WETLAND. San Luis Obispo Co., Black Lake Canyon. This scrub-shrub wetland, which often can be dominated by deciduous species, occurs on the margins of emergent and forested wetlands and ponds in canyon bottomlands and stream banks in coastal central California. At sites that can receive seasonal flooding or saturation, the vegetation tends to be characterized by greater cover of *Lonicera involucrata, Ribes divaricatum, Rosa californica*, and *Rubus ursinus*. At sites that tend to be phreatophytic rather than seasonally flooded or saturated, the vegetation is often dominated by the evergreen shrubs *Baccharis pilularis* and *Rhamnus californica.*

Wetland Type No.: 50.257(26,29.1.853,553.5614,5622,5691,5743,5755,5766)
PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (*TOXICODENDRON, BACCHARIS, MYRICA, RUBUS, SALIX, RHAMNUS*) SEASONALLY-SATURATED OR PHREATOPHYTIC DUNE-SWALE WETLAND. San Luis Obispo Co., Nipomo Dunes, Guadlupe Dunes; Santa Barbara Co., San Antonio Terrace, Vandenberg Air Force Base, Coal Oil Point Reserve; Ventura Co., Emma Wood State Beach, McGrath State Beach, Mandalay Beach County Park. This wetland type occurs on margins and in bottoms of dune swales and ca be quite rich in shrub species.

Wetland Type No.: 50.257(28,29.1.375.5614,5622,5743,5755,5757,5766)
PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (*TOXICODENDRON, BACCHARIS, RHAMNUS, RUBUS, HETEROMELES, SALIX*) INTERMITTANTLY-FLOODED OR PHREATOPHYTIC CANYON-STREAM-BANK WETLAND. Santa Barbara Co., Llaga, Mission, San Jose Creeks. This species-rich scrub-shrub wetland varies considerably in composition in coastal canyons and often is located in riparian corridors between downslope, seasonally flooded forested wetlands and upslope non-wetland habitats and plant associations. Some classifications might consider this a mesic upland scrub rather than a type of wetland. However, its proximity to obvious wetland obligate and facultative wetland shrubs in many examples, gives support to the inclusion of the wetland into this classification. Characteristic species include *Artemisia californica, Baccharis pilularis, Clematis ligusticifolia, Heteromeles arbutifolia, Isocoma veneta, Keckiella cordifolia, Phacelia ramossisima, Rhamnus californica, Ribes* spp., *Rubus ursinus, Salix lasiolepis, Sambucus mexicanus, Toxicodendron diversilobum, Benegesia carpesioides.* **Section 404 Jurisdiction:** This named wetland is probably not regulated as a jurisdictional wetland.

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50.000 SYSTEM PALUSTRINE
50.260 CLASS FORESTED WETLAND

50.261 SUBCLASS B R O A D L E A V E D - D E C I D U O U S

Wetland Type No.: 50.261(22.1.553.5986)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) INTERMITTENTLY-EXPOSED CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. A broadleaved evergreen tree, *Myrica californica* (Wax Myrtle), occurs with *Salix lasiolepis* (Arroyo Willow) in these flooded conditions. This wetland is a rare, apparently natural occurrence of a permanently flooded "swamp" wetland that is located in the canyon bottomland at Black Lake Canyon. This forested wetland is part of a rich and regionally unique ecosystem that also supports palustrine aquatic bed, emergent, and scrub-shrub wetlands. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as a mosaic of jurisdictional wetlands within the high water mark. **FIG. IX-49.**

Wetland Type No.: 50.261(23.1.155.5985, 5986)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA, SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED RIVER-VALLEY-RESERVOIR WETLAND. San Luis Obispo Co., Twitchell Reservoir on the Cuyama River, Alamo Creek portion. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as a mosaic of jurisdictional wetlands within the high water mark. **FIG. IX-50.**

Wetland Type No.: 50.261(24.1.211.5821)
PALUSTRINE FORESTED BROAD-LEAVED DECIDUOUS (*PLATANUS RACEMOSA*) SEASONALLY-FLOODED PLATEAU-STREAM-CHANNEL WETLAND. Riverside Co., Ranta Rosa Plateau, Volcano Rd. at Rancho California Rd. **Section 404 Jurisdiction:** This named wetland is possibly not jurisdictional because of the lack of adequate hydrology. **FIG. IX-33.**

Wetland Type No.: 50.261(24,25.1.382.5921)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*ALNUS RHOMBIFOLIA*) SEASONALLY-FLOODED AND PERMANENTLY-SATURATED FOOTHILL - RIVER - BANK WETLAND. Monterey Co., Pfieffer Big Sur State Park, Big Sur River. *Alnus*-dominated wetland occurs as a row of small trees between the riverine wetlands and needleleaved-evergreen forested wetland dominated by *Sequoia sempervirens* (Coast Redwood). **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland within a very narrow band fringing the channel. **FIG. IX-51.**

Wetland Type No.: 50.261(25.1.552.5986)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) PERMANENTLY-SATURATED RIVER-FLOODPLAIN WETLAND. Monterey Co., Andrew Molera State Park, Big Sur River. This forested wetland of small trees also is flooded occasionally, but the dominant hydrology that affects the vegetation is one of saturation. The understory is composed of hydrophytes such as *Scirpus microcarpus*. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-52.**

Wetland Type No.: 50.261(27.1.552.5833)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*) TEMPORARILY-FLOODED RIVER-FLOODPLAIN WOODLAND WETLAND. Ventura Co., Santa Clara River Valley, Santa Clara River at Mayo Crossing. Woodland is dominated by *Salix laevigata* (Red Willow) with an understory of *Urtica dioica* (Stinging Nettle). **Section 404 Jurisdiction:** This named forms a mosaic of jurisdictional and non-jurisdictional and non-jurisdictional wetlands depending on the presence of wetland hydrology. **FIG. IX-53.**

Wetland Type No.: 50.261(28.1.251.5912)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*ACER MACROPHYLLUM*) INTERMITTENTLY-FLOODED MONTANE-CANYON INVERT WETLAND. Monterey Co., Los Padres National Forest, Mill Creek Watershed. This forested wetland occurs as a narrow row of trees in the bottom of the shallow canyon slope drainage invert. **Section 404 Jurisdiction:** This wetland probably would not be regulated as a jurisdictional wetland.

Wetland Type No.: 50.261(28.1.371.5833)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*) MONTANE-STREAM-BANK-WOODLAND WETLAND. San Bernardino Co., San Bernardino Mountains, Fish Creek Watershed, south of junction of roads 1N05 and 1N02. Along some intermittent streams in the San Bernardino National Forest in the vicinity of the San Gorgonio Wilderness Area, narrow woodlands of *Salix laevigata* (Red Willow) occur in intermittently flooded conditions. This apparently is an uncommon wetland type that is stressed because of the intermittent nature of the sreams. The woodlands occur in the context of Jeffrey Pine Forest.

Wetland Type No.: 50.261(29.1.372,562.5711)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*PLATANUS RACEMOSA*) PHREATOPHYTIC FOOTHILL-STREAM-BANK AND STREAM-TERRACE WETLAND. Santa Barbara Co., Santa Ynez Mountains, Gaviota State Park and Los Padres National Forest, Gaviota Hot Springs Area. Several tributaries to Gaviota Creek form terraces at this site, providing complex hydrogeomorphic landforms that support various wetlands, including this type of forested wetland dominated by *Platanus racemosa* (Western Sycamore). **Section 404 Jurisdiction:** This named wetland probably is not a jurisdictional wetland because of the lack of adequate hydrology and possibly hydric soils. **FIG. IX-54.**

Wetland Type No.: 50.261(29.1.532.5971,5981,5986)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*JUGLANS, POPULUS, SALIX*) PHREATOPHYTIC RIVER-DELTA WETLAND. Ventura Co., Emma Wood State Beach, Ventura River Mouth. Portions of the delta are sufficiently high in elevation to not be flooded during high water events, whereas adjacent sites of lower elevation are flooded seasonally or intermittently and support different types of forested wetland. Dominant trees include *Juglans californica* var. *californica, Populus balsamifera* ssp. *trichocarpa,* and *Salix lasiolepis*. **Section 404 Jurisdiction:** This named wetland is not a jurisdictional wetland because of the lack of a predominance of hydrophytic vegetation in the understory, wetland hydrology, and hydric soils.

Wetland Type No.: 50.261(29.1.554.5983)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS TREMULOIDES*) PHREATOPHYTIC MONTANE-BOTTOMLAND WETLAND. San Bernardino Co., San Gorgonio Wilderness Area, Fish Creek. The San Gorgonio Wilderness Area in the San Bernardino Mountains is the only region in southern California that supports groves of *Populus tremuloides*. These groves have smaller leaves than those to the north (e.g., Sierra Nevada), which results in loss of less water, an adaptation to hot, dry summers. The San Gorgonio population of Quaking Aspen is apparently relictual from Pleistocene time when the region was cooler and wetter than at present. In montane canyon bottomlands, the groves occur in the context of a Needleleaved-Evergreen Forested Wetland dominated by Jeffrey Pine and White Fir. In addition to occurring in these bottomlands, *P. tremuloides* also occurs in small groves along streambanks, such as that for Fish Creek.

Wetland Type No.: 50.261(29.1.561.5981)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS BALSAMIFERA*) PHREATOPHYTIC RIVER-TERRACE WETLAND. Monterey Co., Carmel Valley along the Carmel River, Carmel Valley Rd. at Miramonte Rd. **Section 404 Jurisdiction:** This named wetland is not a jurisdictional wetland because of the lack of a predominance of hydrophytic vegetation in the understory, wetland hydrology, and hydric soils. **FIG. IX-55, 56.**

Wetland Type No.: 50.261(29.1.562.5982,5985)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS, SALIX*) PHREATOPHYTIC STREAM-TERRACE WETLAND. San Diego Co., Kitchen and Cottonwood Creeks. This forest type occurs on narrow terraces along interior valley streams. Dominant trees include *Populus fremontii* ssp. *fremontii* and *Salix laevigata*. An associated tree is *Quercus agrifolia*, a broadleaved evergreen species. **Section 404 Jurisdiction:** This named wetland is not a jurisdictional wetland because of the lack of a predominance of hydrophytic vegetation in the understory, wetland hydrology, and hydric soils.

Wetland Type No.: 50.261(29.1.632.5986)
PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*)

PHREATOPHYTIC CANYON-SLOPE WETLAND. San Luis Obispo Co., Black Lake Canyon, Los Osos Creek, Morro Bay at Los Osos. Canyon banks can be dominated by willow forests where the water table is near the survace, particularly where there is seasonal or permanent saturation nearby caused by seeps or springs. In the examples used here, there is a rich understory of mesic herbaceous species but few obligate hydrophytes, which demonstrates the phreatophytic rather than saturated nature of the habitat. **Section 404 Jurisdiction:** This named wetland is not a jurisdictional wetland because of the lack of a predominance of hydrophytic vegetation in the understory, wetland hydrology, and hydric soils.

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50.000 SYSTEM PALUSTRINE
50.260 CLASS FORESTED WETLAND

50.263 SUBCLASS BROADLEAVED EVERGREEN

Wetland Type No.: 50.263(25.1.711.5931)
PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*LITHOCARPUS DENSIFLORUS*) PERMANENTLY-SATURATED DRAINAGE-HEAD-SEEP WETLAND. Santa Barbara Co., Santa Ynez Mountains, Hollister Ranch. Forested wetland dominated by *Lithocarpus densiflorus* (Tanbark Oak). Largest trees occur in wet soils of a seep and spring and grow upslope from a willow scrub-shrub wetland along the downstream drainage. **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-57.**

Wetland Type No.: 50.263(25.1.712.5952)
PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*MYRICA CALIFORNICA*) PERMANENTLY-SATURATED SLOPE-SEEP WETLAND. San Luis Obispo Co., Morro Bay, Los Osos Creek, Los Osos. Headland slope-seep dominated by *Myrica californica* (Wax Myrtle). **Section 404 Jurisdiction:** This named wetland is a jurisdictional wetland. **FIG. IX-58.**

Wetland Type No.: 50.263(26.1.761.5951)
PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*UMBELLULARIA CALIFORNICA*) SEASONALLY-SATURATED MONTANE-SEEP WETLAND. Santa Barbara Co., Nojoqui Falls, Nojoqui Falls County Park; Ventura Co., North Fork, Matilija Creek at Wheeler Gorge. Clay soils from decomposed bedrock in some mountain canyons may contain seasonal seeps and springs that occasionally support forested wetlands. The occurrence can be either small groves of trees as at Wheeler Gorge or relative large stands of California Bay as at Nojoqui Falls. Associated trees can include *Acer macrophyllum, Alnus rhombifolia,* broadleaved-deciduous species, and *Quercus agrifolia,*

a broadleaved evergreen species.

Wetland Type No.: 50.263(28,29.1.212,372.5936)
PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*QUERCUS WISLIZENII*) INTERMITTENTLY-FLOODED AND/OR PHREATOPHYTIC TERRACE-STREAM-CHANNEL AND BANK WOODLAND WETLAND. San Luis Obispo Co., Sierra Madre Mountains, Cottonwood Creek Drainage, along intermittent terrace streams and drainages adjacent to Cuyama Valley. Wetland occurs as a narrow band of scattered trees in a grassland or chaparral setting. **Section 404 Jurisdiction:** This named wetland probably is not a jurisdictional wetland.

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50.000 SYSTEM PALUSTRINE
50.260 CLASS FORESTED WETLAND

50.264 SUBCLASS NEEDLELEAVED-EVERGREEN

Wetland Type No.: 50.264(24.1.382.5991)
PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*SEQUOIA SEMPERVIRENS*) SEASONALLY-FLOODED FOOTHILL-RIVER-BANK WETLAND. Monterey Co., Santa Lucia Mountains, Pfeiffer Big Sur State Park, Big Sur River. *Sequoia*-dominated wetland occurs as a narrow band on the riverbank below a palustrine forested terrace and above a narrow band of *Alnus*-dominated forested wetland along the margin of the riverine wetland of the Big Sur River. **Fig. IX-51** (adjacent to wetland no. 50.261(24,26.1.382.5921) (Palustrine Forested Broadleaved-Deciduous [*Alnus rhombifolia*] Seasonally-Flooded and Permanently-Saturated Foothill-River-Bank Wetland)

Wetland Type No.: 50.264(25.1.716,726.5962)
PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*PINUS CONTORTA* VAR. *MURRAYANA*) PERMANENTLY-SATURATED MONTANE-SPRING AND SEEP WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area; South Fork, Santa Ana River Watershed. Lodgepole pines occur at springs, seeps, and along streams in small groves or narrow bands of forested wetland in a coniferous forest setting. Understory includes grasses (*Elymus* sp., *Poa secunda*), rushes (*Juncus xiphioides*), sedges (*Carex* spp.) and various forbs (*Geranium robertianum, Geum macrophyllum, Hypericum* sp.).

Wetland Type No.: 50.264(28.1.211,371.5991)
PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*SEQUOIA SEMPERVIRENS*) INTERMITTENTLY-FLOODED MONTANE-STREAM-CHANNEL AND MONTANE-STREAM-BANK WETLAND. Monterey Co., Big Sur River and Mill

Creek Watersheds, Los Padres National Forest. Wetland occurs as a narrow band of trees along canyon streams usually adjacent to other forested wetland types (e.g., *Acer-Umbellularia*) or upland forest types (e.g., *Quercus* spp.).

Wetland Type No.: 50.264(29.1.554.5961,5963)
PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*ABIES, PINUS*) PHREATOPHYTIC MONTANE-BOTTOMLAND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, vicinity of Fish Creek near Rd. 1N05. The San Gorgonio Wilderness Area in the San Bernardino Mountains is the only region in southern California that supports groves of *Populus tremuloides*. In montane canyon bottomlands, the groves occur in the context of this Needleleaved-Evergreen Forested Wetland dominated by *Abies concolor* and *Pinus jeffreyi*. **Section 404 Jurisdiction:** This named wetland probably is not a jurisdictional wetland.

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50.000 SYSTEM PALUSTRINE
50.260 CLASS FORESTED WETLAND

50.267 SUBCLASS MIXED-DECIDUOUS-AND-EVERGREEN

Wetland Type No.: 50.267(27.1.371.5912,5936,5971)
PALUSTRINE FORESTED MIXED-DECIDUOUS-AND-EVERGREEN (*ACER, QUERCUS, PLATANUS*) TEMPORARILY-FLOODED MONTANE-STREAM-BANK WETLAND. San Luis Obispo Co., Sierra Madre Mountains, Cottonwood Creek Drainage. Wetland occurs as a narrow band along montane streams. Dominant species include *Acer macrophyllum, Platanus racemosa,* and *Quercus wislizenii*.

Wetland Type No.: 50.267(27.1.371.5921,5933,5963)
PALUSTRINE FORESTED MIXED-DECIDUOUS-AND-EVERGREEN (*ALNUS, QUERCUS, PINUS*) TEMPORARILY-FLOODED MONTANE-STREAM-BANK WETLAND. San Diego Co., Headwaters of the Sweetwater River, Cuyamacha Mountains, Cuyamacha Regional State Park. Dominant species include *Alnus rhombifolia*, a broadleaved-- deciduous tree, *Quercus agrifolia* var. *oxydenia*, a broadleaved-evergreen tree, and *Pinus jeffreyi*, a needleleaved-evergreen tree. Wetland type occurs as a narrow band along streams within a *Pinus jeffreyi* forest. Often characteristic species include *Platanus racemosa*, a broadleaved-deciduous tree, and *Calocedrus decurrens*, a needleleaved-evergreen tree.

Wetland Type No.: 50.267(29.1.632,634.5912,5951)
PALUSTRINE FORESTED MIXED-DECIDUOUS-AND-EVERGREEN (*ACER, UMBELLULARIA*) PHREATOPHYTIC CANYON AND MONTANE-SLOPE

WETLAND. Monterey Co., Mill Creek Watershed. Wetland occurs as small groves of trees on slopes above montane canyon streambanks and often adjacent to upland forests of *Quercus* spp. **Section 404 Jurisdiction:** This named wetland is probably not regulated as a jurisdictional wetland.

PALUSTRINE WETLAND *NO.: 50.241(26.3.398.5256,6481,6652) FIG. IX-31*
NO.: 50.241(26.3.831.5252,5256,6481,6652) FIG. IX-32

NAME: *PALUSTRINE EMERGENT-PERSISTENT (ARTEMISIA, GUTIERREZIA, DISTICHLIS, POA) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND and MONTANE VERNAL MEADOW WETLAND*

CLASSIFICATION:

System: Palustrine
Subsystem: None
Class: Emergent Wetland
Subclass: Persistent
Water Regime: Seasonally Saturated
Water Chemistry: Alkali
Soil/Substrate: Mineral (gravel, sand, silt, clay)
HGM Unit: Spring-Margin
HGM Unit: Montane Vernal Alkali Meadow
Dominance Types: *Artemisia, Gutierrezia, Distichlis, Poa*

DESCRIPTION: On the margin of Big Bear and Baldwin Lakes in the San Bernardino Mountains, old deltaic deposits are exposed that had been deposited in a Pleistocene lake, which once dominated the Big Bear Valley. These deposits support seasonal seeps and springs that generally have seasonally-saturated meadow wetlands on their margins. When the sites are dominated by shrubs rather than herbaceous species, a type of alkali scrub wetland characterizes the landscape.

SPECIES: Characteristic: *Achillea millifolium, Artemisia ludoviciana, Aster occidentalis, Carex* sp., *Castilleja cinerea, Cirsium congdonii, Distichlis spicata, Equisetum laevigatum, Gayophytum sp., Gutierrezia sarothrae, Hordeum californicum, Ivesia argyrocoma, Leymus triticoides, Muhlenbergia rigens, Poa secunda, Pyrrocoma uniflora var. gossypina, Sidalcea pedata, Thelypodium stenopetalum.* Associated: Shrubs - *Artemisia tridentata.* Herbaceous plants - **Lactuca serriola*, **Tragopogon* sp.

FUNCTIONS and VALUES: Ecosystem Functions: Habitat for rare (e.g., *Ivesia argyrocoma, Pyrrocoma uniflora* var. *gossypina*) and endangered plant species (e.g., *Castilleja cinerea*, FCE; *Sidalcea pedata*, FE; *Thelypodium stenopetalum*, FE). Not every alkali-meadow site includes populations of rare or endangered plant species. Socioeconomic Values: Natural heritage (natural landscape values).

REFERENCE EXAMPLES: CA, San Bernardino Co.: San Bernardino Mountains, Baldwin Lake Ecological Reserve; Big Bear Lake, Fawnskin, Highway 38; Eagle Point, south side of Big Bear Lake.

IMPACTS: Grazing, residential development, fragmentation by transportation corridors, vehicular access, recreational activities. The majority of this sensitive wetland habitat has been eliminated as a result of the urbanization of Big Bear Lake and vicinity.

CONSERVATION EFFORTS: Baldwin Lake Ecological Reserve is a fenced a protected meadow reserve owned and managed by the California Department of Fish and Game. A property at Eagle Point has been set "preserved" and removed from future residential development potential; however, other than a fence to limit vehicular access, there is no protection of the habitat nor of the rare and endangered plant species.

LITERATURE: U.S. Forest Service 1988 a,b,c.

PALUSTRINE WETLAND ***NO.: 50.241(26.3.398.5256,6481,6652) FIG. IX-31***
NO.: 50.241(26.3.831.5252,5256,6481,6652) FIG. IX-32

NAME: *PALUSTRINE EMERGENT-PERSISTENT (ARTEMISIA, GUTIERREZIA, DISTICHLIS, POA) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND and MONTANE VERNAL MEADOW WETLAND*

CLASSIFICATION:

System: Palustrine
Subsystem: None
Class: Emergent Wetland
Subclass: Persistent
Water Regime: Seasonally Saturated
Water Chemistry: Alkali
Soil/Substrate: Mineral (gravel, sand, silt, clay)
HGM Unit: Spring-Margin
HGM Unit: Montane Vernal Alkali Meadow
Dominance Types: *Artemisia, Gutierrezia, Distichlis, Poa*

DESCRIPTION: On the margin of Big Bear and Baldwin Lakes in the San Bernardino Mountains, old deltaic deposits are exposed that had been deposited in a Pleistocene lake, which once dominated the Big Bear Valley. These deposits support seasonal seeps and springs that generally have seasonally-saturated meadow wetlands on their margins. When the sites are dominated by shrubs rather than herbaceous species, a type of alkali scrub wetland characterizes the landscape.

SPECIES: Characteristic: *Achillea millifolium, Artemisia ludoviciana, Aster occidentalis, Carex* sp., *Castilleja cinerea, Cirsium congdonii, Distichlis spicata, Equisetum laevigatum, Gayophytum sp., Gutierrezia sarothrae, Hordeum californicum, Ivesia argyrocoma, Leymus triticoides, Muhlenbergia rigens, Poa secunda, Pyrrocoma uniflora var. gossypina, Sidalcea pedata, Thelypodium stenopetalum.* Associated: Shrubs - *Artemisia tridentata*. Herbaceous plants - **Lactuca serriola*, **Tragopogon* sp.

FUNCTIONS and VALUES: Ecosystem Functions: Habitat for rare (e.g., *Ivesia argyrocoma, Pyrrocoma uniflora* var. *gossypina*) and endangered plant species (e.g., *Castilleja cinerea*, FCE; *Sidalcea pedata*, FE; *Thelypodium stenopetalum*, FE). Not every alkali-meadow site includes populations of rare or endangered plant species. Socioeconomic Values: Natural heritage (natural landscape values).

REFERENCE EXAMPLES: CA, San Bernardino Co.: San Bernardino Mountains, Baldwin Lake Ecological Reserve; Big Bear Lake, Fawnskin, Highway 38; Eagle Point, south side of Big Bear Lake.

IMPACTS: Grazing, residential development, fragmentation by transportation corridors, vehicular access, recreational activities. The majority of this sensitive wetland habitat has been eliminated as a result of the urbanization of Big Bear Lake and vicinity.

CONSERVATION EFFORTS: Baldwin Lake Ecological Reserve is a fenced a protected meadow reserve owned and managed by the California Department of Fish and Game. A property at Eagle Point has been set "preserved" and removed from future residential development potential; however, other than a fence to limit vehicular access, there is no protection of the habitat nor of the rare and endangered plant species.

LITERATURE: U.S. Forest Service 1988 a,b,c.

PALUSTRINE WETLAND *NO.: 50.241(24.1.811.1100) FIG. IX-29*
NO.: 50.241(24.1.811.5224, 6241, 6241) FIG-IX-30

NAME: *PALUSTRINE EMERGENT-PERSISTENT (ELEOCHARIS, ERYNGIUM) SEASONALLY-FLOODED COASTAL-TERRACE VERNAL-POOL WETLAND*

CLASSIFICATION:

System: Palustrine
Subsystem: None
Class: Emergent Wetland
Subclass: Persistent
Water Regime: Seasonally Flooded
Water Chemistry: Freshwater
HGM Unit: Vernal Pools (Coastal-Terrace Type)
Dominance Types: *Eleocharis* spp., *Eryngium* spp.

DESCRIPTION: Santa Barbara coastal-terrace vernal pools occur on the County's "South Coast" on several mesas that are underlain by marine terrace deposits with well-formed but irregularly distributed clay-loam soils and that are uplifted 35-100 feet relative to the adjacent coastline. The vegetation of these pools is generally dominated by persistent perennial species. No regionally endemic plants or animals are reported from this group of wetlands, although many plants found only in Califonia vernal pools occur here.

SPECIES: Characteristic: Perennial plants: *Eleocharis acicularis, E. macrostachya, Eryngium armatum, E. vaseyi, Hordeum brachyantherum, Juncus occidentalis, Pilularia americana.* Annual plants: *Alopecurus saccatus, Callitriche marginata, Crassula aquatica, Elatine brachysperma, Juncus bufonius, Phalaris lemmonii, Plagiobothrys undulatus, Psilocarphus brevissimus.* Associated: **Cotula coronopifolia, Grindelia robusta, *Lactuca serriola, *Lolium multiflorum, *Rumex crispus.*

FUNCTIONS and VALUES: Ecosystem Functions: Habitat for plant species of special concern (e.g., *Hemizonia parryi ssp. australis* and *Pilularia americana*; food chain support (habitat restricted invertebrates and seasonal birds); hydrology; Socioeconomic Values: Recreation (bird watching and botanizing); natural heritage (natural landscape values).

REFERENCE EXAMPLES: Santa Barbara County: Isla Vista (Del Sol Open Space and Vernal Pool Reserve), Ellwood Mesa, More Mesa.

IMPACTS: Agricultural disking; mowing; filling; fragmentation; vehicular and pedestrian access; degraded water quality; vector control (mosquito abatement = draining, petrochemical and bacterial pest control); invasive exotic plants (*Loctuca, Lolium, Rumex,*). Local investigators estimate over 90% of the coastal mesa type of vernal pools have been eliminated largely as a result of urbanization of the region.

CONSERVATION EFFORTS: Enhancement, restoration, re-creation, and creation of Santa Barbara vernal pool habitat has been conducted experimentally (Ferren & Pritchett 1988). Del Sol Vernal Pool Reserve was created in 1978 to preserve local vernal pool habitat.

LITERATURE: Zedler 1987; Ferren and Pritchett 1988; Ferren and Gevirtz 1990.

PALUSTRINE WETLAND ***NO.: 50.241(24.1.811.1100) FIG. IX-29***
NO.: 50.241(24.1.811.5224, 6241, 6241) FIG-IX-30

NAME: *PALUSTRINE EMERGENT-PERSISTENT (ELEOCHARIS, ERYNGIUM) SEASONALLY-FLOODED COASTAL-TERRACE VERNAL-POOL WETLAND*

CLASSIFICATION:

System: Palustrine
Subsystem: None
Class: Emergent Wetland
Subclass: Persistent
Water Regime: Seasonally Flooded
Water Chemistry: Freshwater
HGM Unit: Vernal Pools (Coastal-Terrace Type)
Dominance Types: *Eleocharis* spp., *Eryngium* spp.

DESCRIPTION: Santa Barbara coastal-terrace vernal pools occur on the County's "South Coast" on several mesas that are underlain by marine terrace deposits with well-formed but irregularly distributed clay-loam soils and that are uplifted 35-100 feet relative to the adjacent coastline. The vegetation of these pools is generally dominated by persistent perennial species. No regionally endemic plants or animals are reported from this group of wetlands, although many plants found only in Califonia vernal pools occur here.

SPECIES: Characteristic: Perennial plants: *Eleocharis acicularis, E. macrostachya, Eryngium armatum, E. vaseyi, Hordeum brachyantherum, Juncus occidentalis, Pilularia americana.* Annual plants: *Alopecurus saccatus, Callitriche marginata, Crassula aquatica, Elatine brachysperma, Juncus bufonius, Phalaris lemmonii, Plagiobothrys undulatus, Psilocarphus brevissimus.* Associated: **Cotula coronopifolia, Grindelia robusta, *Lactuca serriola, *Lolium multiflorum, *Rumex crispus.*

FUNCTIONS and VALUES: Ecosystem Functions: Habitat for plant species of special concern (e.g., *Hemizonia parryi ssp. australis* and *Pilularia americana*; food chain support (habitat restricted invertebrates and seasonal birds); hydrology; Socioeconomic Values: Recreation (bird watching and botanizing); natural heritage (natural landscape values).

REFERENCE EXAMPLES: Santa Barbara County: Isla Vista (Del Sol Open Space and Vernal Pool Reserve), Ellwood Mesa, More Mesa.

IMPACTS: Agricultural disking; mowing; filling; fragmentation; vehicular and pedestrian access; degraded water quality; vector control (mosquito abatement = draining, petrochemical and bacterial pest control); invasive exotic plants (*Lactuca, Lolium, Rumex,*). Local investigators estimate over 90% of the coastal mesa type of vernal pools have been eliminated largely as a result of urbanization of the region.

CONSERVATION EFFORTS: Enhancement, restoration, re-creation, and creation of Santa Barbara vernal pool habitat has been conducted experimentally (Ferren & Pritchett 1988). Del Sol Vernal Pool Reserve was created in 1978 to preserve local vernal pool habitat.

LITERATURE: Zedler 1987; Ferren and Pritchett 1988; Ferren and Gevirtz 1990.

CATALOGUE OF PALUSTRINE WETLANDS

This catalogue includes example palustrine wetland types identified during the course of this study. The catalogue is arranged by class and subclass as identified using the preceding key. Within the subclasses, the wetlands are arranged according to the hierarchical wetland type number. There was no attempt on the part of the authors to include all types of wetlands from each level of the hierarchy. Instead, we attempted to include examples of types from various classes, subclasses, water regimes, salinities, hydrogeomorphic units, and dominance types. Illustrated and selectively described examples of palustrine wetland types occur at the end of this catalogue and are cited herein by figure number within the appropriate wetland type. For many wetland types we have assessed the likelihood of jurisdiction under Section 404 of the Clean Water Act. Section 404 of the Clean Water Act regulates the discharge of dredged and fill material into "waters of the Unites States", and is administered jointly at the federal level by the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency.

50.000 SYSTEM PALUSTRINE
50.120 CLASS UNCONSOLIDATED-BOTTOM

50.121 SUBCLASS C O B B L E - G R A V E L

Wetland Type No.: 50.121(21.1.824.1500)
PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-COARSE) PERMANENTLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake. **Section 404 Jurisdiction:** This named wetland is jurisdictional to the ordinary high water mark. **FIG. IX-11.**

* * * * *

50.000 SYSTEM PALUSTRINE
50.120 CLASS UNCONSOLIDATED-BOTTOM

50.123 SUBCLASS M U D

Wetland Type No.: 50.123(21.1.824.1700)
PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-FINE TYPES)

PERMANENTLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake. **Section 404 Jurisdiction:** This named wetland is jurisdictional to the ordinary high water mark. **FIG. IX-11, IX-12.**

Wetland Type No.: 50.123(24.1.143,145.1700,1800)
PALUSTRINE UNCONSOLIDATED-BOTTOM (MUD AND MIXED-FINES) SEASONALLY-FLOODED FAULT-SAG-POND AND VERNAL POND WETLANDS. Santa Barbara Co., Rancho Los Flores. Throughout the coastal mesas, foothills, plateaus, and valleys of the study region, small natural basins, which have a flooding duration that is generally longer than that of vernal pools but less than that of vernal lakes and marshes, form a group of vernal wetlands (i.e., vernal ponds) that have a distinctive combination of associated plant and animal species and that provide particular ecosystem functions. Ecosystem functions include breeding habitat for various amphibians including Western Toads and the endangered Spadefoot Toad and Tiger Salamander; and habitat for narrowly-restricted invertebrates such as Clam Shrimp.

Wetland Type No.: 50.123(26.6.848.1700)
PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-FINES) SEASONALLY-SATURATED EURYHALINE DIKED-ESTUARINE MARSH WETLAND. San Diego Co., San Eliho State Ecological Reserve.

Wetland Type No.: 50.123(24.1.145.1800)
PALUSTRINE UNCONSOLIDATED-BOTTOM (MUD) SEASONALLY-FLOODED VERNAL-POND WETLAND. Santa Barbara Co., foothill-valley of the San Rafael Mountains, Sedgwick Ranch. Persistent emergent vegetation dominated by *Eleocharis palustris* characterizes the margins of the pond and adjacent vernal marsh wetland. Nonpersistent emergent vegetation can colonize the outer margins or the center of the pond in drier years, forming habitat with characteristics of vernal pools. **Section 404 Jurisdiction:** These named wetlands are jurisdictional wetlands probably to the outlet elevation of the pond. **FIG. IX-15, IX-16.**

* * * * *

50.000 SYSTEM PALUSTRINE
50.150 CLASS UNCONSOLIDATED-SHORE

50.154 SUBCLASS C O B B L E - G R A V E L

Wetland Type No.: 50.154(24.1.824.1500)
PALUSTRINE UNCONSOLIDATED-SHORE (MIXED-COARSE) SEASONALLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San

Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake. **Section 404 Jurisdiction:** This named wetland is jurisdictional to the ordinary high water mark. **FIG. IX-11, IX-12.**

* * * * *

50.000 SYSTEM PALUSTRINE
50.150 CLASS UNCONSOLIDATED-SHORE

50.153 SUBCLASS M U D

Wetland Type No.: 50.153(24.1.824.1700, 1800)
PALUSTRINE UNCONSOLIDATED-SHORE (MIXED-FINE TYPES) SEASONALLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake. **Section 404 Jurisdiction:** This named wetland is jurisdictional to the ordinary high water mark. **FIG. IX-11, IX-12.**

* * * * *

50.000 SYSTEM PALUSTRINE
50.210 CLASS AQUATIC BED

50.212 SUBCLASS F L O A T I N G - A L G A L

Wetland Type No.: 50.212(21.1.141.2262)
PALUSTRINE AQUATIC-BED FLOATING-ALGAL (*ENTEROMORPHA*) PERMANENTLY-FLOODED DUNE-POND WETLAND. San Luis Obispo Co., Oso Flaco Lake. Dominant is the floating green alga *Enteromorpha* sp. Aquatic-Bed Rooted-Vascular species *Potamogeton pectinatus, Ruppia cirrhosa,* and *Zannichellia palustris.* **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as jurisdictional wetland within a narrow band fringing the shoreline. **FIG. IX-13.**

Wetland Type No.: 50.212(21.1.147.2262)
PALUSTRINE AQUATIC-BED FLOATING-ALGA (*ENTEROMORPHA*) PERMANENTLY-FLOODED AGRICULTURAL-POND WETLAND. Santa Barbara Co., Vandenberg Air Force Base, MOD III Pond. **Section 404 Jurisdiction:** This named wetland is regulated to the ordinary high water mark and as jurisdictional wetland within

Wetland Type No.: 50.121,123(21.1.824.1500,1700)
Wetland Type No.: 50.52,153(24.1.824.1500.1700)

FIG. IX-11. **PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-COARSE AND MIXED-FINE TYPES) PERMANENTLY-FLOODED GLACIAL-POND WETLAND and PALUSTRINE UNCONSOLIDATED-SHORE (MIXED-COARSE AND MIXED-FINE TYPES) SEASONALLY-FLOODED GLACIAL-POND WETLAND**. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake. View southeastward across pond toward a *Pinus contorta* ssp. *murrayana* (Lodgepole Pine) forest.

Wetland Type No.: 50.121,123(21.1.824.1500,1700)
Wetland Type No.: 50.152,153(24.1.824.1500,1700)

FIG. IX-12. **PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-COARSE AND MIXED-FINE TYPES) PERMANENTLY-FLOODED GLACIAL-POND WETLAND** and **PALUSTRINE UNCONSOLIDATED-SHORE (MIXED-COARSE AND MIXED-FINE TYPES) SEASONALLY-FLOODED GLACIAL-POND WETLAND**. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake. View southward from willow-dominated scrub-shrub wetland across glacial pond toward rack-strewn unconsolidated shore.

Wetland Type No.: 50.212,214(21.1.141.2262,6152,6154,6161)

FIG. IX-13. **PALUSTRINE AQUATIC-BED FLOATING-ALGAL AND ROOTED-VASCULAR (*ENTEROMORPHA, POTAMOGETON, RUPPIA, ZANNICHELLIA*) PERMANENTLY-FLOODED DUNE-POND WETLAND**. San Luis Obispo Co., Oso Flaco Lake. View northward across margin of lake covered (foreground and right center) with aquatic-bed vegetation. Dominants include the floating green alga *Enteromorpha* sp. and the rooted-vascular species *Potamogeton pectinatus, Ruppia cirrhosa,* and *Zannichellia palustris.*

Wetland Type No.: 50.212,214(21.1.147.2262,5121,5142,6152,6161)

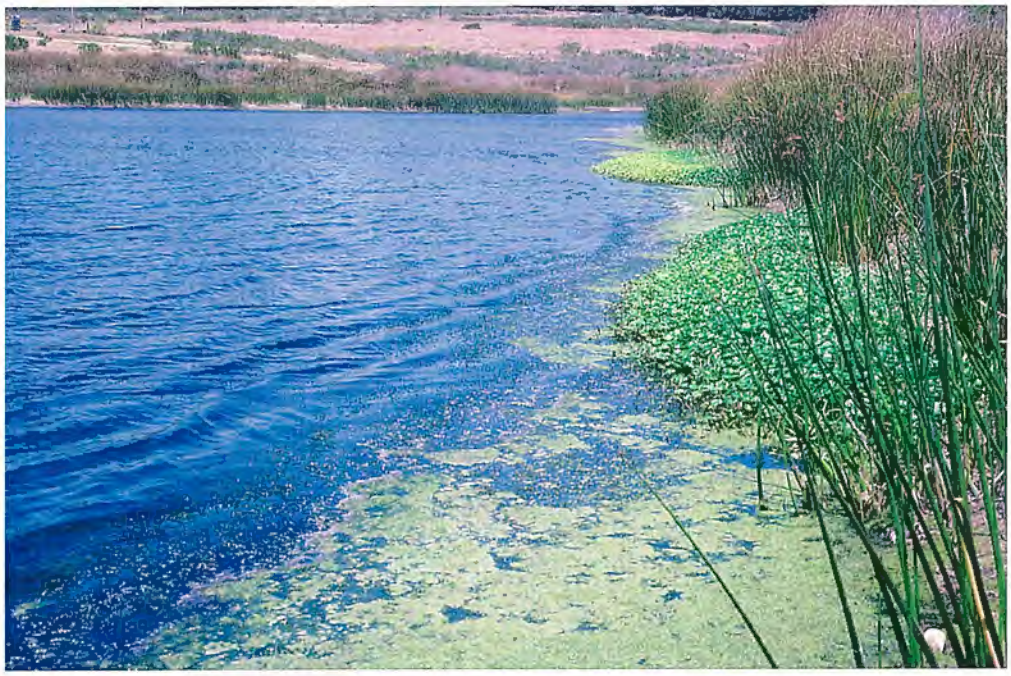

FIG. IX-14. **PALUSTRINE AQUATIC-BED FLOATING-ALGAL AND ROOTED-VASCULAR (*ENTEROMORPHA, CERATOPHYLLUM, MYRIOPHYLLUM, POTAMOGETON, ZANNICHELLIA*) PERMANENTLY-FLOODED AGRICULTURAL-POND WETLAND**. Santa Barbara Co., Vandenberg Air Force Base, MOD III Pond. View northwestward along margin of pond at interface between aquatic-bed and emergent vegetation.

Wetland Type No.: 50.123(24.1.145.1800)

FIG. IX-15. **PALUSTRINE UNCONSOLIDATED-BOTTOM (MUD) SEASONALLY-FLOODED VERNAL-POND WETLAND**. Santa Barbara Co., foothill-valley of the San Rafael Mountains, Sedgwick Ranch. View from foothill onto vernal pond. Alluvial deposits from secondary drainages have blocked this valley, resulting in the ponding of spring water and runoff.

Wetland Type No.: 50.123(24.1.145.1800)
Wetland Type No.: 50.241(24.1.145.6242)

FIG. IX-16. **PALUSTRINE UNCONSOLIDATED-BOTTOM (MUD) SEASONALLY-FLOODED VERNAL-POND WETLAND and PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA*) SEASONALLY-FLOODED VERNAL-POND WETLAND**. Santa Barbara Co., foothill-valley of the San Rafael Mountains, Sedgwick Ranch. View southward across pond and down valley toward natural barrier that impounds flow to form the pond. Persistent emergent vegetation dominated by *Eleocharis palustris* characterizes the margins of the pond and adjacent vernal marsh wetland. Nonpersistent emergent vegetation can colonize the outer margins or the center of the pond in drier years, forming habitat with characteristics of vernal pools.

Wetland Type No.: 50.241(21-23,1.143.6251)

FIG. IX-17. **PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS*) PERMANENTLY-TO SEMIPERMANENTLY-FLOODED FAULT-SAG-POND WETLAND**. Riverside Co., Temescal Wash. View westward across pond in Temescal Wash, toward Santa Ana Mountains. *Scirpus acutus* (left center) dominates the emergent wetland.

Wetland Type No.: 50.241(21-23.1.214.6251,6621,6632)

FIG. IX-18. **PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS, SPARGANIUM, TYPHA*) PERMANENTLY- TO SEMIPERMANENTLY-FLOODED COASTAL-PLAIN STREAM-CHANNEL WETLAND.** Santa Barbara Co., Vandenberg Air Force Base, San Antonio Creek. View westward and downstream. Dominant emergent species are *Scirpus acutus, Sparganium eurycarpum,* and *Typha domingensis*. The adjacent

Wetland Type No.: 50.241(21,25.2.563.6255,6633)

FIG. IX-19. **PALUSTRINE EMERGENT-PERSISTENT (*RORRIPA, SCIRPUS, TYPHA*) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND**. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. View of early-season emergent wetland (foreground), dominated as shown by *Scirpus microcarpus* and *Typha latifolia*, and adjacent palustrine forested wetland (background). The unusual, permanently wet, organic soils of the habitat support many rare and endangered species such as *Rorripa gambelii*, a broadleaved herbaceous species visible among *S. microcarpus*, in addition to other species that reach their southern limits of distribution in wetlands in Black Lake Canyon.

Wetland Type No.: 50.241(21,25.2.563.4322,5325,6223,6255)

FIG. IX-20. **PALUSTRINE EMERGENT-PERSISTENT (*ATHYRIUM, STACHYS, CAREX, SCIRPUS*) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND**. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. View of local dominance types in this acidic type of freshwater marsh. As shown here, dominants include *Athyrium filix-femina, Stachys chamissonis, Carex nutkatensis*, and *Scirpus microcarpus*.

Wetland Type No.: 50.241(24.1.374.6255)

FIG. IX-21. **PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS MICROCARPUS*) SEASONALLY-FLOODED COASTAL-PLAIN STREAM-BANK WETLAND**. San Luis Obispo Co., Morro Bay, Morro Creek. View upstream along low-flow channel. The bank (right) of Morro Creek is dominated by the persistent emergent bulrush *Scirpus microcarpus*.

Wetland Type No.: 50.241(21.3.728.6252,6632)
Wetland Type No.: 50.241(26.3.398.5291,6481,6582)

FIG. IX-22. **PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS AMERICANUS, TYPHA DOMINGENSIS*) PERMANENTLY-FLOODED ALKALI VALLEY-SPRING WETLAND (center) and PALUSTRINE EMERGENT-PERSISTENT (*FRANKENIA, DISTICHLIS, LEYMUS*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND**. View northward toward the Caliente Range. Permanently-flooded and permanently-saturated wetlands (center) of the spring are surrounded by seasonally-flooded and seasonally-saturated emergent wetlands (lower center), which are dominated by *Frankenia salina, Distichlis spicata,* and *Leymus triticoides*. Palustrine scrub-shrub wetland occurs at other seasonally-saturated alkali sites and is dominated by *Suaeda moquinii* (lower left).

Wetland Type No.: 50.241(21.3.728.6252,6632)

FIG. IX-23. **PALUSTRINE PERSISTENT-EMERGENT (*SCIRPUS AMERICANUS, TYPHA DOMINGENSIS*) PERMANENTLY-FLOODED ALKALI VALLEY-SPRING WETLAND**. View northwestward at spring vegetation and toward the Caliente Range.

Wetland Type No.: 50.241(24.1.826.6242,6612)

FIG. IX-24. **PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA, PASPALUM DISTICHUM*) SEASONALLY-FLOODED VERNAL-LAKE WETLAND**. Riverside Co., Santa Rosa Plateau, Mesa de Colorado. View southward across a vernal lake. Vernal wetlands of the Plateau vary in size and function from vernal pools to vernal lakes and from vernal marshes to tenajas. The extensive variation and gradation among types contributes to the species richness of the Plateau.

Wetland Type No.: 50.241(24.1.826.6242,6612)

FIG. IX-25. **PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA, PASPALUM DISTICHUM*) SEASONALLY-FLOODED VERNAL-LAKE WETLAND**. Riverside Co., Santa Rosa Plateau, Mesa de Colorado. Dominance types can vary depending on the time of year, and the depth and duration of flooding. Margins of vernal lakes and pools may be dominated by *Blennosperma nanum*, whereas *Lilaea scilloides* may dominate bottoms of depressions that flood longer. As sites desiccate, dominance types also may change, whereby species characteristic of flooded conditions are replaced by species that colonize exposed soils.

Wetland Type No.: 50.241(24.1.831.5261,6210,6320,6594)

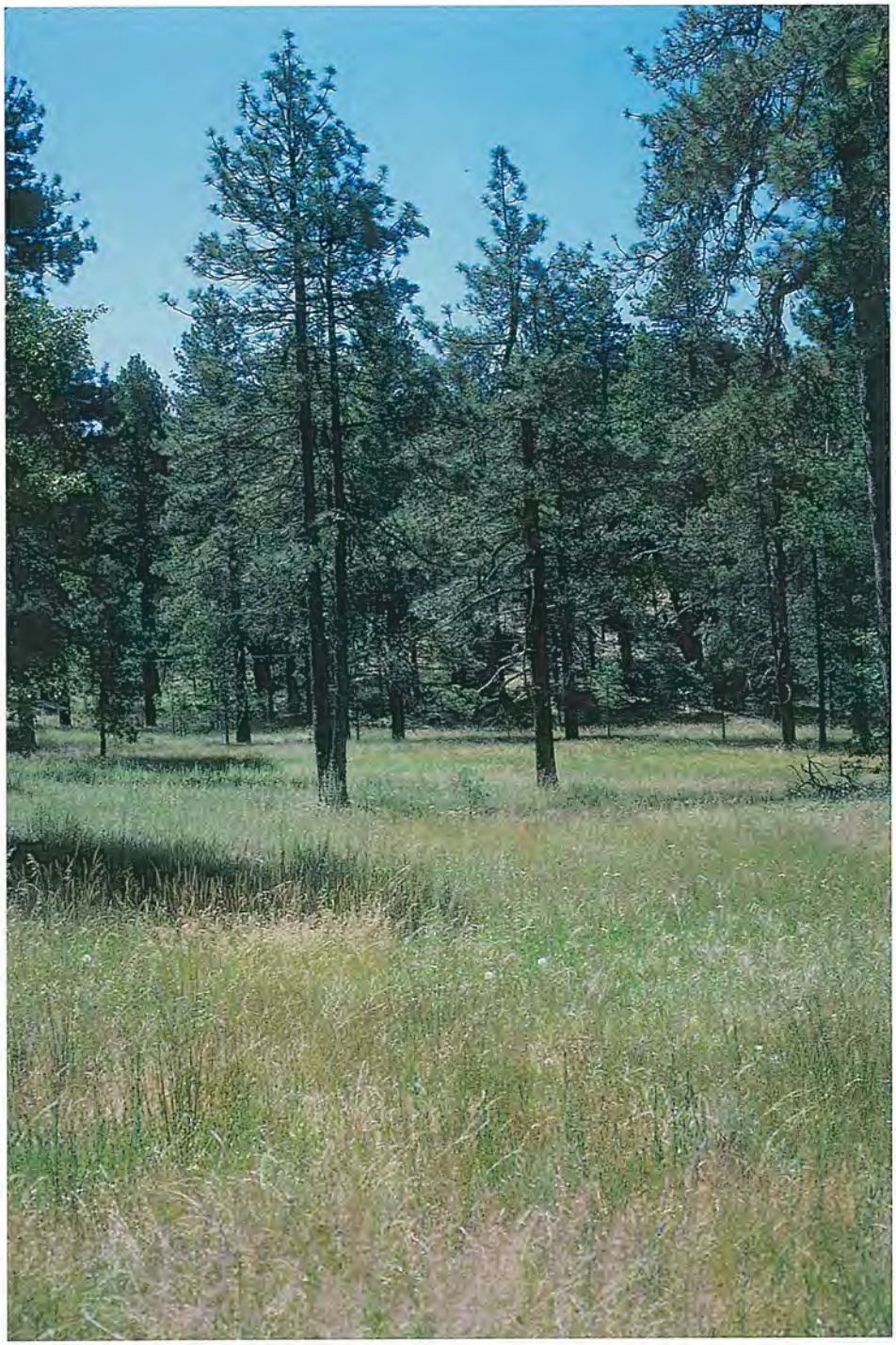

FIG. IX-26. **PALUSTRINE EMERGENT-PERSISTENT (*SOLIDAGO, CAREX, JUNCUS, MUHLENBERGIA*) SEASONALLY-FLOODED MONTANE-VERNAL-MEADOW WETLAND.** San Diego Co., Cleveland National Forest, Laguna Mountains, Laguna Fire Station. View southward along across meadow in forest dominated by *Pinus jeffreyi*. Such meadows are rich in plant species and are dominated or characterized by *Solidago californica, Carex* spp., *Juncus balticus, J. tenuis,* and *Muhlenbergia rigens.* Other characteristic genera include *Artemisia, Aster, Gnaphalium, Mimulus,* and *Sidalcea.*

Wetland Type No.: 50.241(24.1.851.6317)

FIG. IX-27. **PALUSTRINE PERSISTENT-EMERGENT (*JUNCUS MEXICANUS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND**. San Diego Co., Cleveland National Forest, Laguna Mountains, Meadows Information Station. View southeastward across drainage-swale-wetland toward forest dominated by *Pinus jeffreyi* and *Quercus kelloggii*.

Wetland Type No.: 50.241(24.1.851.6325)

FIG. IX-28. **PALUSTRINE EMERGENT-PERSISTENT (*JUNCUS RUGULOSUS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND**. Riverside Co., Santa Ana Mountains, DeLuz Creek Watershed, DeLuz Rd. and Via Vaquera. This wetland can also be classified as a form of vernal-marsh that is characterized by other monocot hydrophytes such as *Eleocharis macrostachya, Juncus mexicanus,* and *Leymus triticoides*.

Wetland Type No.: 50.241(24.1.811.1100)

FIG. IX-29. **PALUSTRINE PERSISTENT-EMERGENT SEASONALLY-FLOODED COASTAL-TERRACE VERNAL-POOL WETLAND**. Santa Barbara Co., Goleta, Ellwood Mesa. View southeastward across a flooded vernal pool toward the Pacific Ocean. Depending on the time of year, flooding state of the water regime, and dominant type of substrate or organisms, such vernal pools may be classified as several wetland types, including unconsolidated-bottom, aquatic bed, emergent-persistent, and emergent-nonpersistent wetlands.

Wetland Type No.: 50.241(24.1.811.5224,6241,6242)

FIG.IX-30. **PALUSTRINE PERSISTENT-EMERGENT (*ERYNGIUM VASEYI, ELEOCHARIS* SPP.) SEASONALLY-FLOODED COASTAL-TERRACE VERNAL-POOL WETLAND**. Santa Barbara Co., Goleta, Ellwood Mesa. View across a desiccated vernal pool toward the Pacific Ocean. Although many vernal pools support nonpersistent emergent vegetation, those of the Santa Barbara area are generally characterized by persistent vegetation that is dominated by *Eryngium vasey, Eleocharis acicularis,* and *Eleocharis macrostachya*. Numerous species characteristic of nonpersistent vegetation also occur in these pools, including the annual plants *Callitriche marginata, Crassula aquatica, Elatine brachysperma,* and *Psilocarphus brevissimus*.

Wetland Type No.: 50.241(26.3.398.5252,5256,6481,6652)FIG.IX-31.

FIG. IX-31. **PALUSTRINE EMERGENT-PERSISTENT (*ARTEMISIA,GUTIERREZIA,DISTICHLIS,POA*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND**. San Bernardino Co., San Barnardino Mountains, Baldwin Lake Ecological Reserve. View southward across alkali wetland toward Baldwin Lake. The mixed-vascular dominance types and endemic flora contribute to the species richness. Dominant or characterisitc species can include *Artemisia ludoviciana, Gutierrezia sarothrae, Distichlis spicata,* and *Poa secunda.* Endemic and rare or endangered species include *Castilleja cinerea, Ivesia argyrocoma, Sidalcea pedata,* and *Thelypodium stenopetalum.*

Wetland Type No.: 50.241(26.3.831.5252,5265,6481,6652)

FIG. IX-32. **PALUSTRINE EMERGENT-PERSISTENT (*ARTEMISIA, GUTIERREZIA, DISTICHLIS, POA*) SEASONALLY-SATURATED ALKALI MONTANE-MEADOW WETLAND**. San Bernardino Co., San Bernardino Mountains, Big Bear Lake, Eagle Point. Although the habitat is different than the spring-margin shown above, this alkali meadow supports the same type of wetland dominants and the endemic, endangered flora restricted to the old deltaic sediments, which were deposited in Pleistocene lakes that once characterized the region.

Wetland Type No.: 50.242(24.1.112.1500,5595)

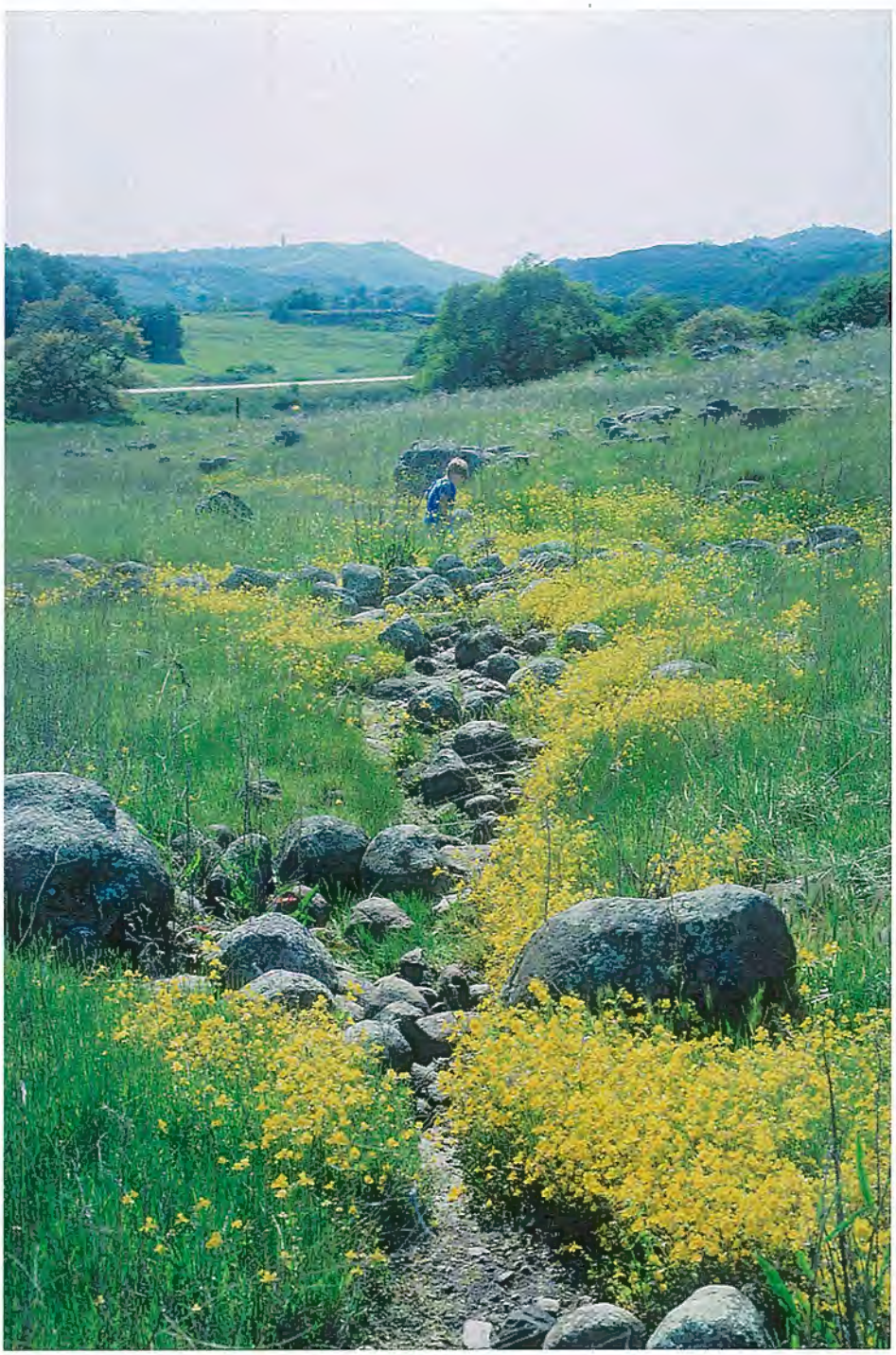

FIG. IX-33. **PALUSTRINE EMERGENT-NONPERSISTENT (MIXED-COARSE AND *MIMULUS GUTTATUS*) SEASONALLY-FLOODED TENAJA WETLAND**. Riverside Co., Ranta Rosa Plateau, Volcano Rd. at Rancho California Rd. View downslope along seasonal drainage that forms post-flow palustrine basins with various dominance types depending on depth and duration of flooding. As shown here, the margins of the tenaja are dominated by *Mimulus guttatus* (yellow flowers).

Wetland Type No.: 50.242(24.1.812.5532)

FIG. IX-34. **PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND**. San Diego Co., Otay Mesa, Upper O'Neil Canyon. View eastward toward Otay Mountain. This driest phase of the Otay vernal pools is characterized by upland and wetland annual species, and as shown here is dominated by *Lasthenia californica* (yellow flowers).

Wetland Type No.: 50.242(24.1.812.5532)

FIG. IX-35. **PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND**. San Diego Co., Otay Mesa, Upper O'Neil Canyon. View northward towards Upper O'Neil Canyon. Vernal pool (center) occurs in trough among mounds (left and right). *Adenostoma*-dominated chaparral occurs in the background.

Wetland Type No.: 50.242(24.1.812.5547)

FIG. IX-36. **PALUSTRINE EMERGENT-NONPERSISTENT (*DOWNINGIA CUSPIDATA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND.** San Diego Co., Kearny Mesa, Miramar Mounds National Natural Monument. View northeastward across a desiccated vernal pool dominated by *Downingia cuspidata* (center, pale-blue flowers) toward *Adenostoma*-dominated chaparral.

Wetland Type No.: 50.242(24.1.812.1500,1600,5547)

FIG. IX-37. **PALUSTRINE EMERGENT-NONPERSISTENT (*DOWNINGIA CUSPIDATA*, MIXED-COARSE, SAND TYPES) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND.** San Diego Co., Kearny Mesa, Miramar Mounds National Natural Monument. View northeastward across desiccated vernal pool with exposed unconsolidated bottom and vegetated areas. As seen here in April 1992, the vernal pool flora has not yet developed to dominate the substrate.

Wetland Type No.: 50.242(28.3.333.5533)

FIG. IX-38. **PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA GLABRATA*) INTERMITTENTLY-FLOODED ALKALI PLAYA-LAKE-SHORE WETLAND**. Riverside Co., San Jacinto Valley, San Jacinto Wildlife Area, vicinity of Mystic Lake. View of historic margin of Mystic Lake, a natural playa lake. Fragmentation of wetlands of the region has converted some lacustrine wetlands into palustrine types, as illustrated here.

Wetland Type No.: 50.242(26.3.523.5532)

FIG. IX-39. **PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED ALKALI VERNAL-PLAIN WETLAND**. Riverside Co., Old Salt Creek Drainage west of Hemet, Florida Ave. and Warren Rd. View across extensive vernal plain, eastward toward the San Jacinto Mountains. Small basins forming vernal pools with different dominance types occur throughout the plain. As shown here, the disked, desiccated plain is dominated by *Lasthenia californica*, but may appear with different dominant plant species depending on the time of year, amount of rainfall in a particular year, proximity to local vernal pool areas, and degree of disturbance.

Wetland Type No.: 50.251(23.1.155.5765,5766)

FIG. IX-40. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA, SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED RIVER-VALLEY-RESERVOIR WETLAND**. San Luis Obispo Co., Twitchell Reservoir on the Cuyama River at Alamo Creek. View southward across the reservoir toward the San Rafael Mountains. The willow scrub formed on alluvial deposits in the reservoir during low-water conditions.

Wetland Type No.: 50.251(23.1.155.5765,5766)

FIG. IX-41. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA, SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED VALLEY-RIVER-RESERVOIR WETLAND**. San Luis Obispo Co., Twitchell Reservoir on the Cuymama River at Alamo Creek. View eastward across Alamo Creek.

Wetland Type No.: 50.251(24.1.482.5769)

FIG. IX-42. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX SCOULERIANA*) SEASONALLY-FLOODED FOOTHILL-RIVER CHANNEL-BAR WETLAND**. Monterey Co., Pfeiffer Big Sur State Park, Big Sur River. View westward down-river. Scrub-shrub wetland dominated by *Salix scouleriana* (left center) occurs on a channel-bar adjacent to riverine unconsolidated-bottom wetland.

Wetland Type No.: 50.253(24.1.453.5623)

FIG. IX-43. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*BACCHARIS SALICIFOLIA*) SEASONALLY-FLOODED VALLEY-STREAMBED WETLAND**. San Diego Co., Cottonwood Creek, Rt. S-1 northwest of Lake Morena. View northward across streambed.

Wetland Type No.: 50.253(24.1.453.5781)

FIG. IX-44. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*TAMARIX RAMOSISSIMA*) SEASONALLY-FLOODED VALLEY-STREAMRED WETLAND**. San Diego Co., Cottonwood Creek, Rt. S-1 northwest of Lake Morena. View northward across streambed. This wetland is dominated by the invasive-exotic shrub *Tamarix ramosissima*.

Wetland Type No.: 50.253(26.3.398.5643)

FIG. IX-45. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*SUAEDA MOQUINII*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND**. San Luis Obispo Co., Cuyama River Valley, Highway 166, east of Highway 33. View northwestward across the alkali scrub-shrub wetland toward the Caliente Range. As shown here in late-summer, *Suaeda moquinii* (foreground) is characteristically red in color.

Wetland Type No.: 50.253(26.3.398.5643)

FIG. IX-46. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*SUAEDA MOQUINII*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND**. San Luis Obispo Co., Cuyama River Valley, Highway 166, east of Highway 33. View northward toward the Caliente Range. Palustrine emergent wetland (upper center) is adjacent to the scrub-shrub wetland.

Wetland Type No.: 50.253(27.1.384.5627)

FIG. IX-47. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*PLUCHEA SERICEA*) TEMPORARILY-FLOODED CANYON-RIVER-BANK WETLAND**. San Luis Obispo Co., Cuyama River Gorge. View northeastward up-river at low-flow conditions. *Pluchea*-dominated scrub-shrub wetland (center) occurs on a narrow, undercut bank.

Wetland Type No.: 50.253(28.1.561.5627)

FIG. XI-48. **PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*PLUCHEA SERICEA*) PHREATOPHYTIC RIVER-TERRACE WETLAND**. San Luis Obispo Co., Cuyama River Valley. View southeastward across terrace and adjacent river-channel toward the Sierra Madre Mountains. *Pluchea sericea* forms an extensive scrub-shrub wetland on alluvial soils deposited in the lower valley, up-river from the Cuyama River Gorge.

Wetland Type No.: 50.261(22.1.553.5986)

FIG. IX-49. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) INTERMITTENTLY-EXPOSED CANYON-FLOODPLAIN WETLAND**. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. View eastward toward forested wetland. A broadleaved evergreen tree, *Myrica californica* (Wax Myrtle), occurs with *Salix lasiolepis* (Arroyo Willow) in these flooded conditions.

Wetland Type No.: 50.261(23.1.155.5985,5986)

FIG. IX-50. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA, SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED RIVER-VALLEY-RESERVOIR WETLAND**. San Luis Obispo Co., Twitchell Reservoir on the Cuyama River, Alamo Creek portion. View northward across flooded forested wetland (right) and the adjacent terrace (left) that supports a depleted example of phreatophytic oak-sycamore woodland wetland.

Wetland Type No.: 50.261(24,25.1.382.5921)

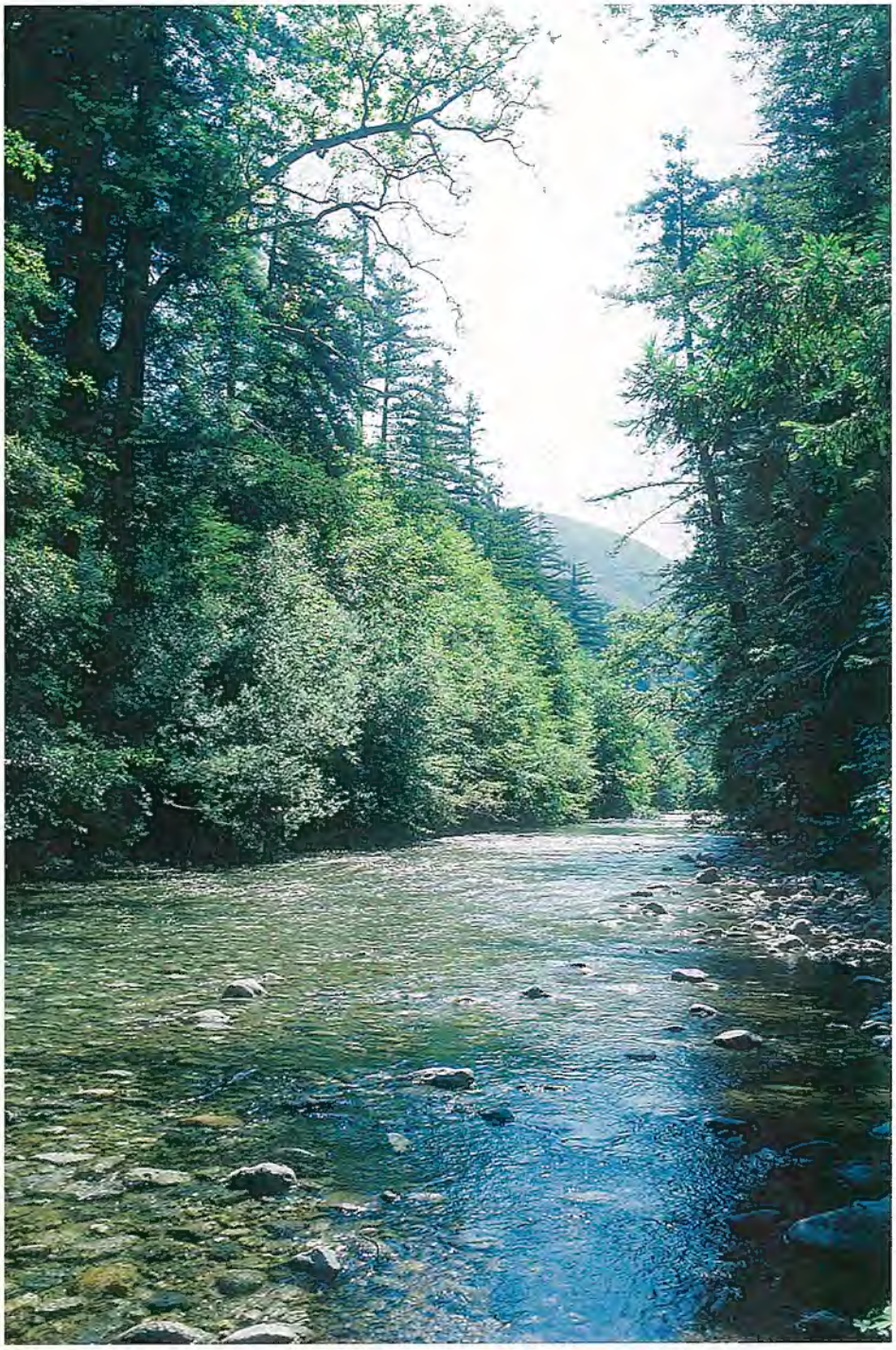

FIG. IX-51. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*ALNUS RHOMBIFOLIA*) SEASONALLY-FLOODED AND PERMANENTLY-SATURATED FOOTHILL-RIVER-BANK WETLAND.** Monterey Co., Pfeiffer Big Sur State Park, Big Sur River. View southeastward, upstream along the Big Sur River. *Alnus*-dominated wetland (center) occurs as a row of small trees between the riverine wetlands (foreground) and needleleaved-evergreen forested wetland (right and upper left) dominated by *Sequoia sempervirens* (Coast Redwood).

Wetland Type No.: 50.261(25.1.552.5986)

FIG. IX-52. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) PERMANENTLY-SATURATED RIVER-FLOODPLAIN WETLAND**. Monterey Co., Andrew Molera State Park, Big Sur River. View westward toward river mouth. This forested wetland of small trees also is flooded occasionally, but the dominant hydrology that affects the vegetation is one of saturation. Note the understory is composed of hydrophytes such as *Scirpus microcarpus*.

Wetland Type No.: 50.261(27.1.552.5833)

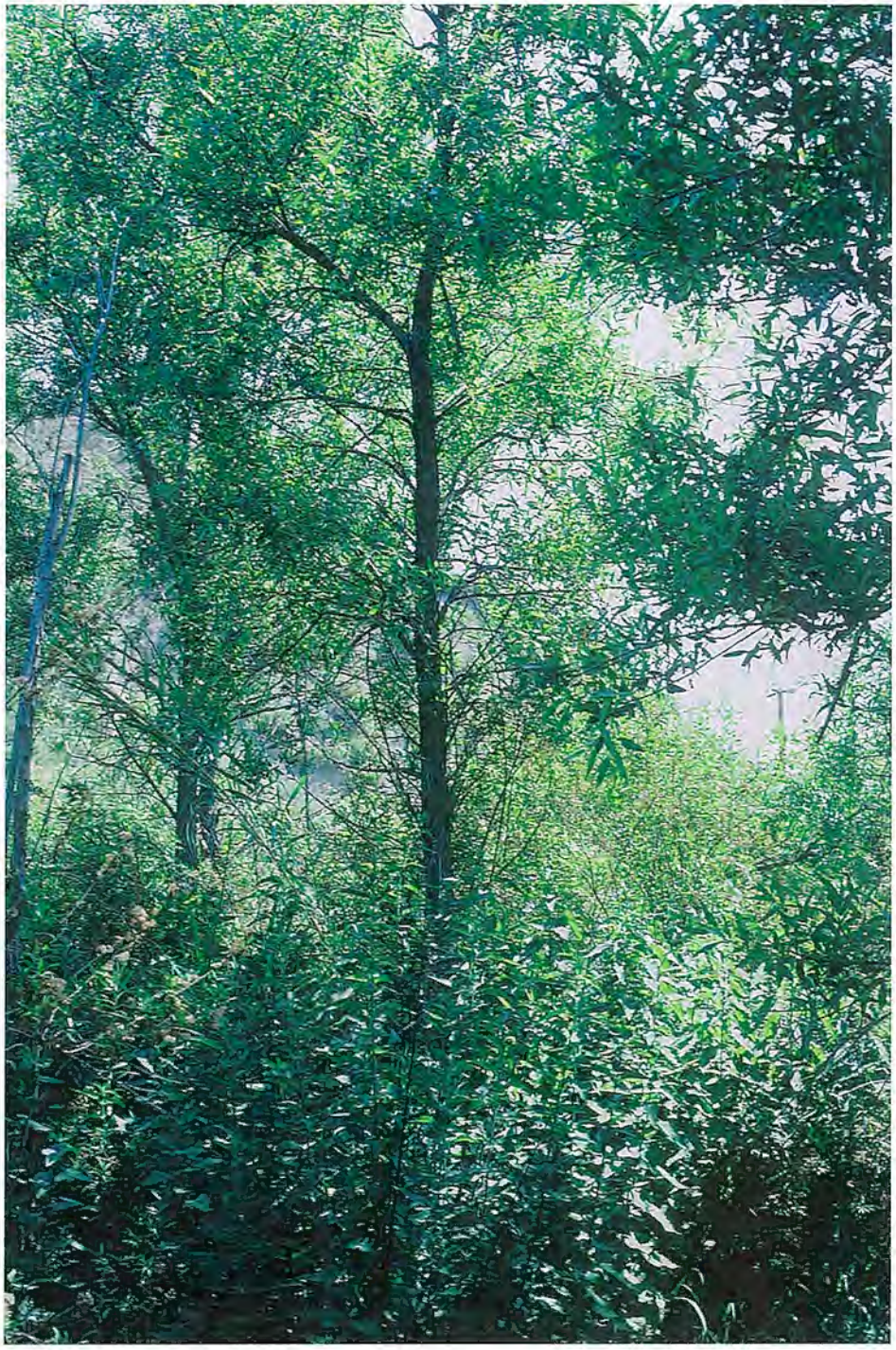

FIG. IX-53. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*) TEMPORARILY-FLOODED RIVER-FLOODPLAIN WOODLAND WETLAND.** Ventura Co., Santa Clara River Valley, Santa Clara River at Mayo Crossing. View of woodland dominated by *Salix laevigata* (Red Willow) with an understory of *Urtica dioica* (Stinging Nettle).

Wetland Type No.: 50.261(29.1.372,562.5711)

FIG. IX-54. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*PLATANUS RACEMOSA*) PHREATOPHYTIC FOOTHILL-STREAM-BANK AND STREAM-TERRACE WETLAND**. Santa Barbara Co., Santa Ynez Mountains, Gaviota State Park and Los Padres National Forest, Gaviota Hot Springs Area. View northward along unimproved road. Several tributaries to Gaviota Creek form terraces at this site, providing complex hydrogeomorphic landforms that support various wetlands, including this type of forested wetland dominated by *Platanus racemosa* (Western Sycamore).

Wetland Type No.: 50.261(29.1.561.5981)

FIG. IX-55. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS BALSAMIFERA*) PHREATOPHYTIC RIVER-TERRACE WETLAND**. Monterey Co., Carmel Valley along the Carmel River, Carmel Valley Rd. at Miramonte Rd. View westward from foothill across deciduous forested wetland dominated by *Populus balsamifera* ssp. *trichocarpa* (Black Cottonwood) in December 1991.

Wetland Type No.: 50.261(29.1.561.5981)

FIG. IX-56. **PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS BALSAMIFERA*) PHREATOPHYTIC RIVER-TERRACE WETLAND**. Monterey Co., Carmel Valley along the Carmel River, Carmel Valley Rd. at Miramonte Rd. View of *Populus balsamifera* ssp. *trichocarpa* (left and center) and *Platanus racemosa* (Western Sycamore, right). Foreground has been graded.

Wetland Type No.: 50.263(25.711.5931)

FIG. IX-57. **PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*LITHOCARPUS DENSIFLORUS*) PERMANENTLY-SATURATED DRAINAGE-HEAD-SEEP WETLAND**. Santa Barbara Co., Santa Ynez Mountains, Hollister Ranch. View southwestward at north-facing slope dominated by *Lithocarpus densiflorus* (Tanbark Oak). Largest trees (center) occur in wet soils of a seep and spring and grow upslope from a willow scrub-shrub wetland along the downstream drainage.

Wetland Type No.: 50.263(25.1.712.5952)

FIG. IX-58. **PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*MYRICA CALIFORNICA*) PERMANENTLY-SATURATED SLOPE-SEEP WETLAND**. San Luis Obispo Co., Morro Bay, Los Osos Creek, Los Osos. View southeastward across estuarine salt-marsh (foreground) dominated by *Salicornia virginica* and estuarine brackish-marsh (center and right) dominated by *Juncus acutus*, toward a headland slope-seep dominated by *Myrica californica* (Wax Myrtle, upper right).